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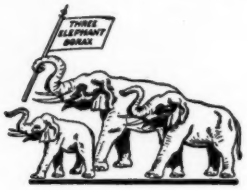

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Better Crops with PLANT FOOD

The Whole Truth—Not Selected Truth

R. H. STINCHFIELD, *Editor*

Editorial Office: 1155 16th Street, N. W., Washington 6, D. C.

VOLUME XXVIII NO. 2

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The American Potash Institute, Inc.

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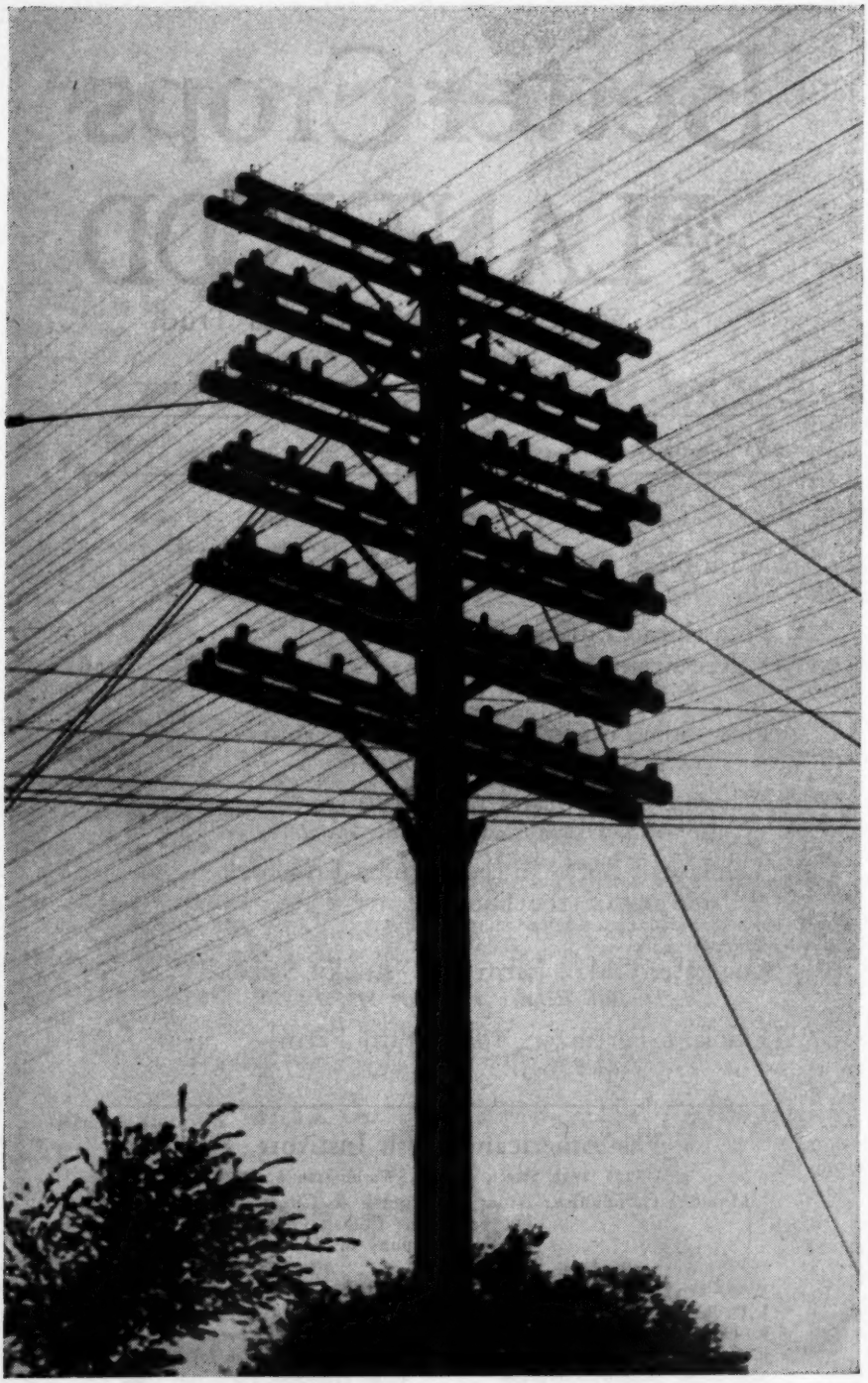

A SILENT CARRIER OF VITAL IMPORTANCE

Better Crops with PLANT FOOD

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VOL. XXVIII WASHINGTON, D. C., FEBRUARY, 1944 No. 2

Sizing up the Situation—

With Neck Stuck Out!

Jeff McDermid

DO I STICK out my weatherbeaten neck by saying that agriculture has little to fear and not much to lose should Congress enact compulsory, universal national service? My decision to that effect lies in my belief that no single large segment of the working population in our embattled land has already enlisted in a steady contribution to a basic need to the extent that farm folks have; and that the preparatory training, fitting, and toughening processes for our food and fiber output cost us less in time and money than any other industrial trade or profession requires in order to meet the emergency in production per man.

Likewise in the course of this rambling piece, I want to bring out a point or two about the adjustments that farmers have to make, or have already made in their way of thinking, adjustments which are about as drastic and revolutionary as the adjustments and new viewpoints realized by service men and green factory apprentices in wartime.

By this I do not mean any shifts in attitude by farmers toward doing a good, busy day's work, regarding all idleness, panhandling, and malingering as inventions of the devil; or their inherent distaste for squandering resources and frittering away financial gains. Much as some elements of society hereabouts have set us attractive examples of the profits from sloth and waste, the farmer as a class gives all such and sundry a cold and shrugging shoulder.

Farmers have surprised themselves by the scope and power of their food offensive. I have heard observations

by spokesmen at rural meetings during these war days as each new crop and livestock goal was broached and threshed out. Almost always they spoke in highly conservative terms about what food they could furnish and when. There was the usual amount of griping and fault-finding, which is also a trait of the courageous marines abroad whenever they tackle a fierce bit of jungle resistance. Scarcity of help and broken-down implements were mentioned in most farm groups, as the leaders doubted their ability and that of their communities to meet the challenge of Uncle Sam or adhere to his vagueness and vagary.

RIGHT now in the northern states it's the weather which furnishes the text of agrarian debates. Inasmuch as we seem to be having a snowless early winter and no great reserve of soil moisture, with winterkilling of forages threatened, you often hear the wise old-timers bemoaning the outlook and claiming we have overshot our wad.

They do this not in any unpatriotic or disturbing partisan manner, but it's just a streak of gamblers' suspicions which makes them fearful we can't always get the trump cards in such a hazard of natural forces. Seven years of plenty, they opine, may very easily be followed by seven years of dry springs and stunted provender.

They go tramping over the meadows a lot these days prior to the usual drifts, examining the plant crowns and the depth of the frost line, because recent emergencies emphasize the fundamental place of leafy, green hay and lush, verdant pastures in livestock economy. They know well that your annual corn or oats crop is not called upon for the vast amount of constant hourly growth and vigor all season long that we demand of the legumes and mixed grasses, from whence come our main stores of minerals and carotene.

They put some trust and hope in the promise of more nitrogen fertilizers, released as a by-product of the heavy munitions business; overbalanced perhaps by less potash than they'd like to have around handy—but back of it all they register concern because without seepage of water through the soil particles, nothing productive emerges for the emergency, neither vegetable, animal, nor mineral. And when the sly machinations of Jack Frost are seen on the meadows, all hope rests with new spring seeding—and this year the seed is not a hot prospect. Last year's corncobs won't do the trick, and last year's hay-mows are dwindling of fodder.

Despite unforeseen dangers to fetter the food army, my present observations relate to what has gone before, to the gosh-blasted surprise on the faces of the plowmen and threshing and silage crews as the cheerful, glorious returns came in from wonderfully abundant harvests just when the world wanted them the worst. There were probably only a few farmers able to snort with pride and say "I told you so." Farmers usually look for the worst to happen and then take their reward of bounty with a weather eye cast forward to the season ahead. Your average farmer is no Pharisee praying for success because he has been such a slick operator. He is more like poor old Job, sitting amid his tormentors and scratching his blisters, with scant hope of making the grade.

THEREFORE, jot down faith in organized unity as the No. 1 adjustment of the rural think-box. By this is meant accomplishment in an uncommon, historic, and marvelous way, brought about by a sort of unconscious bond of unity and pushful purpose animating all grangers alike from coast to coast.

Hitherto, our rural minds have turned selfward and suspicious-like toward any over-all attempt to work up a lather of sentiment for universal movements in one main direction. For a while, and at irregular periods of stress and in scattered geographic areas, we have seen farm folks respond en masse to orators and publishers and politi-

cians; or maybe get the fever temporarily from circuit-riding zealots during depressions. But not for very long, only perhaps to correct some wrong, and elect somebody soon to forget all about it.

Once or twice in the present successful campaign for food production, mistakes were made that would have assumed tragic proportions had they been left unchecked and without true rural guidance at the last moment. Once upon a recent time, some officialdom wanted a pledge circulated among the farmers to have them sign up to raise more food and do their "duty." This pledge reeked of mock heroics and stank to heaven in the nostrils of the untamed and independent sod-busters. Other examples of a like kind will occur to my observant readers, bearing me out in the contention that farmers respond best to unconscious and unexpressed movements, things lying deep within them as a challenge and a motivating force, rather than to mawkish and bombastic slogans and "resolves."

So this achievement of agriculture finally gives isolated members of the profession more confidence in what organized team-work can do, when it is not camouflaged in a bog of blunders.

Appeals were not made for selfish conquest of the middleman or the money-lender, or the outwitting of some other fancied foe to farming: or based on collecting tithes to launch a new and super-duper rural society to to be run without regard to the other workers of the world. Down in the souls of the crop-raisers was a layer of elemental determination and national trust, sifted in with some local pride, and the plowshare of adversity and danger turned this to the surface to germinate the movement we have seen succeed so well.

Moreover, for the most part they "laughed off" the little irritations and regulations and red-tape which were foisted on them as part of the soil regimental orders. Like the dough-boy Yanks afield, they poked hearty fun at their drill-masters, tore them apart in sarcasm, but knuckled down and won the battle when the going got tough.

THE next adjustment I imagine has taken place since the war among farm folks is a sort of breaking away from the attitude which has not been properly called "provincialism." I don't like that term because in this case it won't quite fit. For the past thirty years farmers as a class have been modernized and acclimated to the social scenery pretty well. I refer instead to what is more like self-sufficiency, or maybe self-righteousness, a feeling so often seen in the open country mind of yore—too much rugged, inward bent, class thinking.

To be sure, even last summer most farmers did not relish having nosey and ambitious city volunteers come out to take a hand at the harvest, but that is not what I mean exactly either. That is mere pride and satisfaction in doing an accustomed job better than the uninitiated.

What I mean is the old idea that farmers were in a separate and dis-

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Potassium Content and Potash Requirement of Louisiana Soils

By M. B. Sturgis

Department of Agronomy, Louisiana State University, University Station, Baton Rouge, Louisiana

RECENT experimental work at the Louisiana Agricultural Experiment Station has shown that all of the general soil areas of Louisiana contain some localities that are deficient in potassium and that crops grown in these localities respond to potash fertilization. Hundreds of soil tests and analyses with scores of field experiments furnish data which permit at least a preliminary delineation of the potash needs of the State at the present time.

The available potassium content and need and the crop response to potash fertilizers for the general soil areas or divisions are summarized in the following table.

The greatest needs for potash based on the low potassium content of the soils, the large extent of the area, and the relatively high response of crops to potash fertilizers are in the hilly and rolling areas of the Coastal Plain. Here approximately 24,000 tons of K_2O could be used profitably each year. The flatwoods areas of the Coastal Plain are much more deficient in potassium, but due to the fact that a small percentage of these areas are in crops, only about 3,000 tons of K_2O are needed.

The soils of the Coastal Prairies (Pleistocene Prairie Terrace) are more deficient in potassium than has been formerly recognized, and cotton on these soils responds more profitably than in any other general area. This is where most of the rice in Louisiana is grown. If the rice and pasture crops were judiciously fertilized, the requirement for potash fertilizers in this area would be in excess of 13,000 tons of K_2O annually.

The more extensive use of potash on the soils of the Mississippi terraces and loessial hills has been in progress for several years, and very profitable crop responses are stimulating the farmers' interest. Next to the hilly and rolling areas of the Coastal Plain, this general area has the greatest amount of crop acreage and the greatest farm population. To fully satisfy the potash fertilizer needs of this area, 15,000 tons of K_2O would be required.

The soils of the Ouachita and Red River flood plains are not usually deficient in potassium. Only in Ouachita River bottoms are there extensive and continuous areas showing potassium deficiency. In these areas cotton responds very profitably to potash fertilization. The soils of the Red River bottom are higher in available potassium than those of the Ouachita and the deficient areas are smaller and more localized. It would require approximately 6,000 tons of K_2O annually to support well-balanced fertilizer practices for this general area.

Many relatively small areas showing potassium deficiency occur in the Mississippi bottom, and field tests have proven that potash fertilizers can be profitably used on these deficient areas. The potato, however, is the only crop

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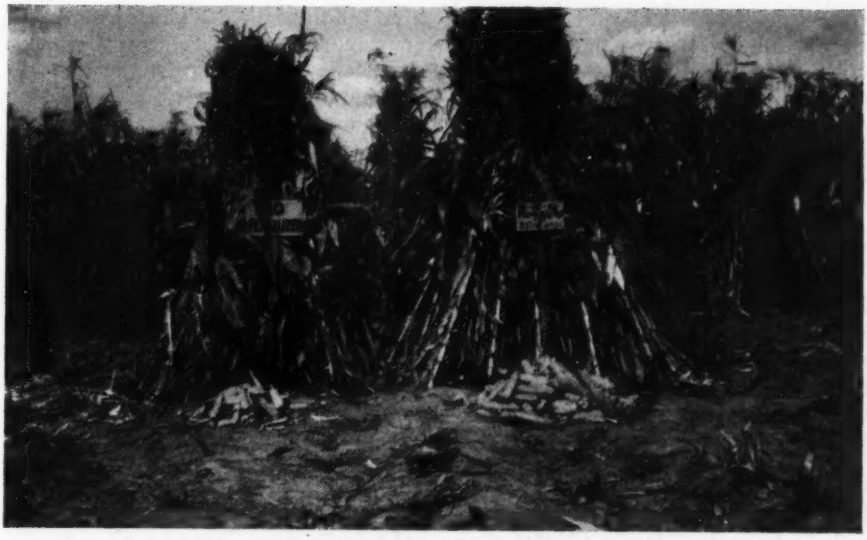

Plow-sole fertilizer, 10-10-10 at 700 lbs. per acre plus starter 3-12-12 at 125 lbs., more than doubled the yield of fodder and increased the yield of ear corn from 12.8 to 84.6 bu. per acre on Spangler Brothers' farm at Jefferson, Wisconsin.

Plow-Sole Fertilizers Increase the Profits

By C. J. Chapman

Soils Department, University of Wisconsin, Madison, Wisconsin

OCCASIONALLY, our enthusiasm for practices we consider sound, practical, and economical gets ahead of the supporting evidence in actual field trials and yield data. In the early days of my work as an Extension Specialist in Soils, it was frequently said, "Chapman's talks are 95 per cent enthusiasm and 5 per cent facts." This, I admit, may have been true in the early days of my extension career; however, I still maintain I had plenty of supporting data and evidence to back up my enthusiasm even in those early days. I am convinced that frequently my farmer audiences, as well as my colleagues, were either prejudiced or uninformed, and were certainly apathetic toward this idea of commercial fertilizers and their use on Wisconsin dairy farms.

It was only a few years ago that one of our staff professors (now deceased) made the statement, "This man Chapman is recommending potash promiscuously all over my territory." The facts were that my demonstrations in this north-central Wisconsin area had satisfied me that potash was urgently needed, in addition to phosphate. In my test plots, potash had produced spectacular results. I had set up a number of demonstrations on farms scattered over this particular area, and my conclusions, based on actual results,

were well founded. Hundreds of field trials in subsequent years in this Colby soils area have conclusively shown that my "promiscuous" recommendations of potash were actually pretty sound, and right now fertilizer dealers, county agents, and other farm leaders, as well as the farmers themselves, are crying for more potash in this area.

It has taken 25 years to sell the idea of commercial fertilizers in Wisconsin, and it is only now after we have built up a tremendous mass of irrefutable evidence and county agents and other extension leaders in the field have "sold themselves" through field trials and soil tests that the interest and demand for fertilizers by farmers has actually taken hold in this State.

Farmers would not have purchased and used on their farms 175,000 tons of commercial fertilizers in 1943 if they were not quite certain it would pay.

But now again it is being said that "Chapman is off the deep end" in his enthusiasm for this new plow-sole method of applying fertilizer.

I reported the results of our 1942 demonstrations in an article prepared for this magazine last year entitled "Plow-Sole Fertilizers Make Good Showing." Some readers of this article wrote me letters stating that I was jumping at conclusions, that my data were not sufficient or even consistent. I answered some of these critics by telling them I was aware of the inconsistencies in the data presented in this article, but that had they seen and followed these plots throughout the growing season, they would doubtless have arrived at the same conclusions I had. It is true that demonstrations without replication sometimes give us yield data that are not always consistent. Had I been the pioneer in this new idea of plow-sole application of fertilizers, and had only my Wisconsin results on which to base my conclusions and recommendations, I would doubtless have been a little more conservative in the endorsement of this new method of applying fertilizer. But I had seen with my own eyes the amazing results of experiments conducted in the State of Indiana. These experiments were set

On the Rufus Gillette farm at Mazomanie, Wis., the yield of corn was increased from 21.5 bu. per acre on the unfertilized plot to 45.0 bu. per acre on the plot receiving plow-sole 10-10-10 at 700 lbs. per acre, plus starter 3-12-12 in the hill at 150 lbs. per acre. The soil here was a sandy loam in a low state of fertility.

Barley seeded to clover on the farm of Clifford Hopkins at Morrisonville, Wis., was fertilized on the plow-sole with 0-20-10 at 450 lbs. per acre, and an additional 100 lbs. per acre of 0-20-10 drilled with the seed. Yields of barley on the various plots were as follows:

0-20-10 at 450 lbs. (plow-sole plus 0-20-10 at 100 lbs., drilled)=54.8 bu. per acre
0-20-10 at 100 lbs. drilled=45.2 bu. per acre
No fertilizer=31.0 bu. per acre

Ranker growth of clover on the plow-sole plots was noted last fall. Hay yields of clover in 1944 will tell the final story.

up by Dr. George Scarseth and his associates at Purdue University; plots had been replicated and carefully laid out. I had seen pictures and heard reports on the results of similar demonstrations carried on in other states. Dr. Scarseth has carried out extensive trials under a wide range of crop and soil conditions in Indiana for some three or four years. The results of his work have now been written up in an attractively illustrated Purdue Agricultural Experiment Station Bulletin No. 482, "How to Fertilize Corn Efficiently in Indiana."

The results of our plow-sole fertilizer trials in Wisconsin in 1943 were more consistent and even more outstanding than the results in 1942. The fields selected for our 1943 plots did vary greatly in productivity. Some fields were low in fertility and some were high; some of the fields had been manured, others not. In all cases, a 10-10-10 fertilizer was used with and without starter fertilizer in the hill. The plots ran the entire length of the field. The rate of application of the plow-sole fertilizer, 10-10-10, ranged from 500 to 700 lbs. per acre on the various farms, except in one of the demonstrations where two rates of application were compared—500 and 1,000 lbs. per acre. Edwin Blaney, on whose farm this particular set of plots was set up, is one of our larger growers of hybrid seed corn. The 500-lb. rate plus starter fertilizer made a 38-bushel increase of hybrid seed corn. The 1,000-lb. application plus starter fertilizer made a 47.6-bushel increase. The extra 9½ bushels for the additional 500 lbs. did not pay for itself, figured on the basis of current market prices for corn. However, at $5 per bushel (net to Mr. Blaney) the 9½ bushels did actually pay and leave a large margin of profit, and, of course, there will be a much greater residual carry-over benefit to grain and legume seedings in 1944 and 1945 where this heavier treatment was made than on the plot receiving the 500 lbs. per acre.

In our 1943 demonstrations, the plot

Hemp on the farm of Louis Rauls of De Forest responded in an almost miraculous manner to plow-sole application of a 10-10-10 fertilizer. This shows the difference in growth in mid-June.

making the poorest showing was set up on the Kindschi Brothers farm near Prairie du Sac. The soil here was a dark-colored Waukesha silt to fine sandy loam; the field had been manured the spring of 1943 prior to plowing. We knew at the outset that this field was in a good state of fertility. But even here the increase in yield (14½ bushels per acre) at current market prices for corn just about paid for the fertilizer. Here again, however, the Kindschi Brothers produce hybrid seed corn and planted this field to hybrid-crossing stocks. At $5 per bushel, this 14½-bushel increase did leave a handsome profit over and above cost of the fertilizer.

Right here it should be stated that in Wisconsin, where manure from our livestock herds is quite generally available and used on our corn land, it is a question whether these heavier applications of high-nitrogen fertilizer applied by the plow-sole method will pay. Rather, we are recommending under such conditions the use of starter fertilizer with an attachment on the corn planter as a supplement to the plant food supplied in the form of animal manures.

In another demonstration on Spangler Brothers farm at Jefferson, the field selected was a level, low-lying, light-colored silt loam (Fox silt loam) in a very poor state of fertility. No manure had been used on this field for many years. Spangler Brothers are growers of hybrid seed corn. However, this particular field was in such a low state of fertility that they did not attempt to grow hybrid-crossing stocks; rather,they planted this entire field, some 20 acres, to silage corn. There was a tremendous response to the plow-sole and hill applications of fertilizer on this field. We had expected to see rather striking results, but the actual yield and response of corn greatly exceeded our expectations. The corn on the plow-sole treated plot never seemed to suffer from a lack of moisture or plant food at any time during the growing season.

The yield of fodder was more than doubled. The actual yield of ear corn was increased from 12.8 to 84.6 bushels per acre. (Nothing but nubbins on the unfertilized plots.) At the time of harvest, Spangler Brothers figured the possible returns had this 20-acre field been planted to hybrid-crossing stocks and all fertilized with 10-10-10 on the

plow sole. It would have made a difference of several thousand dollars in the net returns from this field. These brothers have purchased an attachment and are planning to use a considerable tonnage of 8-8-8 on their fields of crossing stocks in 1944.

As I review the results of our plow-sole work both in 1942 and 1943, I think I am safe in making the following general suggestions and observations:

Growers of hybrid seed corn will find it highly profitable to apply a high-nitrogen balanced fertilizer on their thinner fields, especially where corn follows corn and where little or no manure is available. Even where clover sod or green manure is plowed under, but where no manure is used, a liberal application of a fertilizer containing from 4 to 6 per cent nitrogen, from 8 to 10 per cent of phosphoric acid, and 8 to

TABLE 1.—1943 RESULTS—FERTILIZER DEMONSTRATIONS ON CORN

Name & address of cooperator and Soil type	Treatment	How applied	Rate per Acre	Per cent moisture	Yield* per Acre	Increase per Acre
			Lbs.		Bu.	Bu.
Clarence Pester	3–12–12+	drilled	125			
Whitewater	10–10–10	plow sole	500	20.5	121.5	39.9
	10–10–10	plow sole	500	24.6	115.9	34.3
Clyde	3–12–12	drilled	125	21.6	102.7	21.1
clay loam	No fertilizer			25.5	81.6	
Kindschi Bros.	3–12–12+	in hill	150			
Prairie du Sac	10–10–10	plow sole	500	35.0	74.9	14.2
	3–18–9+	in hill	150			
Waukesha	10–10–10	plow sole	500	35.1	69.3	8.6
silt loam	10–10–10	plow sole	500	35.1	63.9	3.2
	3–18–9	in hill	150	35.0	63.9	3.2
	No fertilizer			35.2	60.7	
Edwin Blaney	3–12–12+	in hill	150			
Madison, R. 3	10–10–10	plow sole	500	31.9	103.3	38.0
	3–12–12+	in hill	150			
Carrington	10–10–10	plow sole	1,000	31.9	112.9	47.6
silt loam	3–12–12	in hill	150	41.1	78.4	13.1
	No fertilizer			42.0	65.3	
Rufus Gillette	3–12–12+	in hill	150			
Mazomanie	10–10–10	plow sole	700	34.5	45.0	23.5
	3–12–12	in hill	150	34.3	31.8	10.3
Plainfield	0–12–12	in hill	150	34.3	30.8	9.3
sand	No fertilizer			46.5	21.5	
Spangler Bros.	3–12–12+	drilled	125			
Jefferson	10–10–10	plow sole	700	38.0	84.6	71.8
	10–10–10	plow sole	700	47.2	48.7	35.9
Fox	3–12–12	drilled	125	45.0	41.9	29.1
silt loam	No fertilizer			55.0	12.8	
					Silage Lbs. per Acre	Increase
Spangler Bros.	3–12–12+	drilled	125			
Jefferson	10–10–10	plow sole	700		30,597	15,490
	10–10–10	plow sole	700		21,987	6,880
Fox	3–12–12	drilled	125		19,338	4,231
silt loam	No fertilizer				15,107	

* Calculated on 14 per cent moisture basis.

10 per cent potash will be found profitable. In figuring the profit from these heavy applications of fertilizer by the plow-sole method, we must give credit to the possible residual benefit which will carry over to the grain and legume seedings the year following corn. It is not fair to charge the entire cost of the fertilizer against the increases, in the corn yields alone. Our results have shown that on the thinner, poorer soils that will normally produce from 30 to 40 bushels per acre, we can expect a profitable return, even at market values, from an application of from 500 to 800 lbs. per acre of a 10-10-10 or 8-8-8 fertilizer. Starter fertilizer such as 2-12-6 or 3-12-12 is recommended at 75 to 100 lbs. per acre in the hill in addition to the plow-sole treatment. At present market prices for corn there is a greater possible margin of profit than will be the case when corn drops to 75¢ per bushel in years ahead. But bear in mind also that the cost of fertilizer materials, especially nitrogen, may likewise drop when the war is over.

There is one point to remember in connection with these heavy-rate applications of high-nitrogen fertilizers. We must bear in mind that the continuous cropping of our land year after year to corn, or any other soil-depleting crop, will very soon use up what little humus our soils now possess. And the danger lies in the fact that with these high-nitrogen fertilizers, we will be tempted to crop-crop-crop until our soils are worn out. We recommend clover in the rotation and the use of phosphate and potash fertilizer at the time of seeding down, and urge our livestock farmers to conserve carefully and return to their fields the plant food contained in their stable manure. Attention to erosion control by crop cover, strip cropping, and contour farming must be given, and all other soil conservation and crop-management practices must be followed.

However, the placement of fertilizer down on the plow sole at a depth of 5 to 8 inches in concentrated bands is a safe and sound idea. We know that the root systems of most all farm crops completely fill the surface plow layer and even go much deeper to secure adequate amounts of moisture to sustain growth during drouth periods. Plant foods to

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The Rauls hemp field and the plow-sole treated acre in mid-August; the strip on the right was not fertilized.

Where Do We Stand With Fertilizers?

By Ford S. Prince

University of New Hampshire, Durham, New Hampshire

IN the January issue of BETTER CROPS WITH PLANT FOOD, I discussed much of the research work in New England having to do with the relative responses of the three primary elements in plant growth, with a view of arriving at some conclusions as to how important each one is in our system of farming. This article is an attempt to summarize the information presented in the previous one and, insofar as possible, to present conclusions pertaining thereto.

In attempting to do this, thoughts like this came into the picture. What would happen in case it were not possible to get one of these elements for potato growing? When we think of fertilizers in New England, we generally associate them with potatoes, as such a large percentage of the fertilizer used in this region is applied to this crop; and every man, woman, and child is very dependent upon potatoes for his daily diet.

In the previous article we presented data from Maine, New Hampshire, and Connecticut, showing average yields of potatoes grown with no nitrogen, no phosphoric acid, and no potash, also yields where grown with an extra amount of each of these elements. In order to impress upon the general public the idea of supplying at all times ample fertilizer to this crop to avoid a serious potato shortage, we have taken the yield of potatoes for 1943 for Maine and for the remainder of New England and computed what the crop would have been had we been able to secure no nitrogen, phosphoric acid, or potash. We also have calculated what it would have been if more than normal amounts of each of these elements had been applied, assuming of course that in each case the other two elements would be present in normal amounts, which was the basis on which the yield variations were taken. These computations are presented in Table VI.

TABLE VI.—INFLUENCE OF DIFFERENT AMOUNTS OF NUTRIENTS ON POTATO YIELDS

Yield in Millions of Bushels

	Maine	Rest of New England	Total
Actual yield 1943	73.5	11.0	84.5
Yield without N	57.3	9.1	66.4
Yield with extra N	71.3	11.3	82.6
Yield without P_2O_5	53.7	7.7	61.4
Yield with extra P_2O_5	73.5	11.4	84.9
Yield without K_2O	25.8	6.6	32.4
Yield with extra K_2O	79.4	11.3	90.7

The New England States produced almost 85 million bushels of potatoes in 1943. Of these 73.5 million were grown in Maine. The calculated reductions or increases for the omission or for an extra amount of an element show that without any nitrogen our yield would have fallen from 84.5 million to 66.4 million, without phosphoric acid to 61.4 million, and without potash we would have been "in" for a potato famine with but 32.4 million bushels of potatoes. The data also indicate that we could have increased our yield slightly by applying additional phosphorus and that we could have brought the yield to over 90 million bushels by applying potash considerably in excess of normal amounts.

Feed for livestock is just as dependent upon fertilizers as are potatoes. Like potatoes, milk and other dairy products form a part of the daily diet of all of us. It is generally conceded that the best method of meeting the grain shortage, and one which every farmer can practice, is to increase the acreage and yield of all kinds of legume crops, because of their high protein content. These crops are very dependent upon potash and phosphoric acid for high yields.

these crops if each acre were fertilized with 300 pounds of an 0-20-20 fertilizer, over and above that which it now receives, if any. The increases are those which may be expected, not with one element, but by applying a balanced phosphoric acid - potash mixture, and under the assumption that the soil pH is high enough or contains lime enough so that this factor will not limit yields.

These figures, frankly, are partly estimates. For example, we have no data on the acreage or probable yield of a pure stand of ladino clover. But we do know that the acreage to ladino is assuming fairly large proportions, and our own data secured in 1943 would indicate that the unfertilized yield would be at least two tons per acre of oven-dry material whereas properly fertilized this yield would reach three tons. Hence the estimates may be too conservative. Insofar as possible, acreage and yields are drawn from census data, while the yields under the heading "Probable yield, properly fertilized" are based upon round figures representing averages from research data.

In the last column, Table VII, we have calculated from average analyses

TABLE VII.—NORMAL AND PROBABLE YIELDS OF LEGUMES

Crop	Acreage	Total Yield Normally Fertilized	Probable Yield Properly Fertilized	18% Grain Equivalent of Increase
	Acres	*Tons*	*Tons*	*Tons*
Alfalfa	49,000	85,000	122,000	32,000
Ladino clover	40,000	60,000	90,000	26,000
Red and alsike clover	120,000	180,000	270,000	60,000
Total	209,000	325,000	482,000	118,000

In Table VII we have listed the acreage of alfalfa in New England according to the last census. Normal yields are given for this crop, together with the estimated acreage and normal yield of red and alsike clover in hayfields and ladino clover in haylands and pastures.

Probable yields are also given for the grain equivalent of the increased production of properly fertilized legumes. This is translated into an 18 per cent dairy ration, and the total of the increase amounts to the startling figure of 118,000 tons of dairy feed. At present costs this would be worth a little more than 7 million dollars. The

increase could be accomplished with about 30,000 tons of 0-20-20 fertilizer, which would cost in the neighborhood of 1.4 million dollars. The farmers following this practice would save a little over 5 million dollars, to say nothing of easing the strain on our transportation system by more than 80,000 tons of freight.

These data apply merely to the acreage that is presumably already in legumes and do not include the possibility of extending and enlarging the legume acreage to meet our outstanding need. They show in effect that we could, by proper fertilization, save about one-sixth of all the grain we now purchase. Doubling the acreage and fertilizing adequately would mean a saving of a third or more in purchase of these concentrated feeds.

cows to feed and with more than a million head of cattle in the area, this need becomes apparent. Attention to pastures is doubtless just as important from the total forage standpoint as attention to legumes.

What would happen if it were possible to treat one-half acre of pasture for each cow in New England? If materials were available and if farmers were minded to do it, this would mean treating 350,000 acres of pasture at one time, land which is available and susceptible of improvement, too.

Drawing upon data in our previous article (Table V) and using only the data for the untreated and completely fertilized areas, we have constructed Table VIII which shows the possibilities in this respect.

The saving of as large a portion of

TABLE VIII.—NORMAL AND PROBABLE PRODUCTION OF PASTURE

	Total Yield Dry Matter	Total Yield Protein	Gain in Protein	Grain equivalent in 18% dairy ration
	Tons	*Tons*	*Tons*	*Tons*
Fertilized	437,500	78,750	53,375	296,765
Unfertilized	186,375	25,375	.....	.....

Nitrogen was purposely left out of the discussion on legumes here, not that it isn't often necessary or profitable to use, but because the response varies more or less with the amount of manure that has been applied, whether grasses have been used in the legume mixture, and like factors. That it is profitable to use, in general, is brought out later in discussing unit fertilizer responses in Table X.

There is never any question about the response for nitrogen when applied to permanent pastures, since in this case we are working with a mixed stand of grasses and clovers. Like the legume situation, an abundance of fertilizers could mean a great deal just now in New England if we had improved or could improve an acre or even one-half acre of pasture for each cow by top-dressing. With 700,000

the grain fed to dairy cows in New England by a method such as this is rather startling. One is tempted to ask, why hasn't it already been done? The answer is, it has on a few farms but up to this point it has been so easy to procure grain that farmers haven't needed to use a method that to them is relatively untried for one which, though more costly, has always worked.

This material has been presented in some detail for two reasons: First, to indicate how dependent we are upon fertilizers in this area at all times and especially in a crisis; Second, to point out that since we are so dependent upon them, it might be desirable in the future to look forward to building-up stockpiles of these strategic materials in the area.

Since we have suggested the building-up of stockpiles of fertilizer mate-

rials, it may be of interest to go further with this study to indicate, if possible, where emphasis should be placed in this connection. Here again it will be necessary to resort to the research data to evaluate the relative responses of the three elements involved.

To do this it appears necessary to eliminate the law of diminishing returns, which if taken into consideration would require the use of more data than have as yet been assembled. There is some compensation in this idea, however, for it makes the job much simpler.

Inasmuch as in this summary we discussed the potato crop first, we present those data first. In order to simplify the material, flat averages of responses in Maine, New Hampshire, and Connecticut are taken in constructing the table, and these only for amounts up to one ton of normal fertilizer.

Perhaps it may be well to repeat that the values in Table IX are flat averages for response of each element when increased from zero to four units of nitrogen, and from zero to eight units of phosphoric acid, and from zero to seven units of potash.

Like calculations have been made for legumes from data which have previously been reviewed. In this case we have taken the liberty to compute values for a combination of one unit each of P_2O_5 and K_2O in addition to their separate value, since much of this work indicates that balance is of especial importance with these two elements in legume production.

These caluculations are listed in Table X. The data are all from New Hampshire, since our work has been so arranged and conducted that the separate values can easily be obtained. Besides, we sometimes feel a little safer when we are playing on our own home grounds. The data, however, cover several experiments and contain an average of 13 values for nitrogen, 16 for phosphoric acid, 15 for potash, and 5 for the PK combination.

TABLE IX.—UNIT RESPONSE FOR FERTILIZER MATERIALS UPON POTATOES.

Element	Response per Unit	Value of Response	Cost per Unit	Net over Cost
	Bushels	*Dollars*	*Dollars*	*Dollars*
N	15	20.25	2.50	17.75
P	11	14.85	1.40	13.45
K	22	29.70	.90	28.80

The data in Table IX show the story for potatoes. Fertilizer costs have been calculated in this and succeeding tables at $40.00 per ton for nitrate of soda, $28.00 per ton for 20 per cent superphosphate, $48.00 for 60 per cent muriate of potash, and potato prices have been calculated at $1.35 per bushel.

Increases for units of nitrogen may

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TABLE X.—RETURNS FROM DIFFERENT NUTRIENTS ON HAY

Element	Increase Hay per Unit	Value of Increase	Cost of Fertilizer per Unit	Gain over Cost
	Pounds	*Dollars*	*Dollars*	*Dollars*
N	519	5.19	2.50	2.69
P	128	1.28	1.40	−.12
K	417	4.17	.90	3.27
PK (one each)	464	4.64	2.30	2.34

In 1942, 70 per cent of the dairy farms in Tennessee grew alfalfa, as compared with 27 per cent in 1936. Increased use of lime and fertilizer, including borax, is the chief contributing factor.

The Use of Borax in the Legume-Livestock Program of the South

By H. E. Hendricks

Extension Agronomist, University of Tennessee, Knoxville, Tennessee

COMPREHENSIVE information on the use of borax in the legume-livestock program is not available for many important agricultural areas in the South. The South is by no means a uniform section of the country. The climate, soils, topography, and even the people themselves differ greatly. These and other factors contribute to a variable agriculture. Final conclusions of just how and where the use of borax is important in growing legumes and livestock, accordingly, are not justified.

In Tennessee alone, for example, the Unaka Mountain area has a climatic and growing season similar to that around Chicago. Many different conditions can be seen in the 550 miles across the State to the Mississippi delta cotton-growing country. There are successful livestock farmers in all these areas of major differences, and the most successful now follow about the same pattern of legume forage production.

Tennessee conditions have been covered fairly well with test demonstrations, using borax on legumes; and conditions in parts of most of the other Southern States compare with conditions in certain parts of Tennessee. This discussion, therefore, will be confined chiefly to Tennessee, as indicative, at least, of what may be expected elsewhere.

It is a very well-known fact that in the last few years the Southern States have been making gradual but significant advancements in agriculture. This has been brought about principally by an increase in forage production, both

hay and pasture, and an increase in the numbers of livestock on farms.

To illustrate, the increase in hay production, between 1936-42, was 51% in 11 Southern States (excluding Texas and Oklahoma), whereas, in the United States as a whole, the increase was only 18%. This has been reflected in the number of forage-consuming animals kept on Southern farms, and the trend is increasing the productivity of the land.

During this same period, the dairy and beef cattle numbers increased in the Southern States 15%, while in the United States as a whole, the increase was only 8%. Grain production during this time did not increase significantly in the South. The increase in cattle numbers has been made possible almost entirely by the increase in hay and pasture. The cattle on Southern farms have also been fed better, as indicated by the fact that the hay consumed per hay-consuming animal unit has increased 38%, whereas in the United States as a whole, the increase was only 1%. The grain feeding remained about the same.

Since the South can not compete successfully with other sections of the country in grain production, it must take advantage of the more favorable long growing season in the production of forage. To utilize this climatic advantage most successfully, at least two distinct disadvantages must be overcome; the first, the naturally infertile and impoverished soil of the major portion of the area; and second, the severe drouth normally experienced some time during the summer, the effect of which is naturally much worse on thin land.

To overcome this first disadvantage, the use of limestone and fertilizer has been greatly increased. In Tennessee, for example, the use of limestone from 1936-42 increased over 200%, and the use of fertilizer increased approximately 100%. This increase in lime and fertilizer use is enabling the growth of forage crops which will better withstand the hot, dry periods of summer and the production of pasture crops through the winter months, thus providing grazing intermittently throughout the year.

In Tennessee this more diversified forage production program is essential to safeguard the livestock farmer by as-

Without borax, alfalfa stands soon deteriorate on thin or infertile land. This Rhea county field is in its second year. Note dense stand at left, treated with borax; thin stand at right, untreated.

Potash and borax, as well as limestone and phosphate, are necessary for successful alfalfa production in Tennessee, as indicated by this Knox county field. Left, potash and borax added at the rate of 100 lbs. muriate and 25 lbs. borax.

suring adequate nutritious roughage to tide him over unfavorable seasons. Accordingly, livestock farmers have been advised to provide themselves with feed insurance by producing moderate acreages of alfalfa for both hay and pasture, and also as much other winter-grazing crops, including crimson clover and small grains, as their land and other facilities will permit. The acreage of these crops, especially alfalfa, has increased materially during the past few years. The use of borax is believed to be partly responsible for this increase and is expected to play a greater part in still further expanding that acreage.

In 1936, a study of 472 farms classified as dairy farms was made to determine their forage production program. At that time, 27% of these dairy farms grew alfalfa, averaging one-fourth acre for each cow on the farm. In 1942, 70% of these same dairy farms grew alfalfa, averaging .4 acre per cow. During this period, the total milk production in Tennessee has increased 22%, in comparison with 14% increase for the Southern States and 16% for the United States as a whole.

In 1938, it was concluded that the acreage of alfalfa in Tennessee could not continue to be increased because profitable yields were not obtained over a long enough period to justify the cost of establishing a stand. It has now been proved that a major cause of failure was boron deficiency; and that by the use of borax along with limestone and fertilizer, alfalfa can be grown more successfully on the farms that had been growing it, and furthermore, that the acreage can be expanded successfully to farms and to types of soil upon which alfalfa could not be grown profitably before borax application entered the Tennessee program of agriculture.

In 1942, reports of the hay yields from 43 field demonstrations scattered over the State from the Unaka Mountains in East Tennessee to the Mississippi River were obtained. These fields were located on what may be termed, for Tennessee, good alfalfa land. The soil had all been limed, and phosphate was added where needed. The addition of 20 pounds of borax per acre increased the yield of hay on an average 26%. Tennessee farmers have never used much potash, but on these demonstrations, where 200 pounds of muriate

of potash were used in addition to the borax, the increase in yield was 42%.

County Agents of Tennessee were asked how they thought the use of borax was going to affect the legume-livestock production in their particular counties. A few of their replies may be cited as typical. M. L. Alphin of Hardeman county, a West Tennessee cotton county, bordering the State of Mississippi, wrote: "It is a well-understood fact that no livestock program can be any better than the feed produced for that livestock. Hardeman county is no exception to the rule that applies to all major cotton counties, and feed has been a very limiting factor in the livestock program. Feed, or the absence of it, can very easily determine the side of the ledger on which the red marks will appear.

"The experience of all of our demonstrators has been very good to excellent when borax was applied to alfalfa and red clover. Mr. E. F. Daniel, of the Saulsbury community, says that it means the difference between three tons of alfalfa hay per acre and practically no hay per acre. The experience that he has had has already been directly responsible for three other farmers applying borax to their alfalfa. This same experience has been very evident on all other demonstrations except one. This particular alfalfa demonstration was on real good land and has had almost every available kind of fertilizer applied except borax.

"It seems that with the good start we are getting with borax it will mean that we can grow feed for livestock on a par with farmers in the corn belt and others with high-producing land. We would like to try borax on pastures to determine if it will help our grasses to stand the summer dry season, and if that should prove effective, I think it would mean more toward improving the livestock program than anything since the land was cleared years ago.

"The results of using borax have been most gratifying and I think we have just started in the field of fertilizer research."

Mr. Alphin's perspective toward a livestock program based on local feed production appears to be sound.

From the letter received from County Agent Amos in the Upper East

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S. F. Conner, Dayton, Tenn., the first farmer in Tennessee to use borax on alfalfa, tells Dr. J. W. Turrentine, President, American Potash Institute, how borax and potash have affected his alfalfa and, consequently, his dairy production.

August Pasquali poses in front of his farm home. Part of the barns is visible in the background.

Coalgate, Okla., Farm No "Lucky Streak"

By A. D. Bull

Soil Conservation Service, Atoka, Oklahoma

GRAIN sorghums grew so tall that they could not be cut with a corn binder and were grown with the light rainfall that came in 1943, one of the worst drought years in the past ten in Oklahoma. This is a true story coming from the August Pasquali farm three and one-half miles east of Coalgate.

Pasquali's farm is different from the average eastern Oklahoma farm because it glitters with the fortifications of modernization. It supports a beautiful home of native stone and a flock of big, red barns for the beef cattle, the dairy cattle, and the hogs. There are special farm machinery sheds, a milk house, a garage, and a work shop. There are more than $25,000 worth of farm buildings in addition to the investment in fences, farm machinery, livestock, farm ponds, the water-sewage system, and the finger-tip conveniences that are to be found everywhere.

No ordinary farm can support such an outlay. Pasquali's is no ordinary farm. It has a history that is as thrilling as the story of the discovery of gold in the Klondike. Here is a farm made by a man who discovered that there is gold-dollar wealth in the soil—if the soil is conserved and improved—if the soil is worked as a factory and not as a mine.

Twenty-four years ago August Pasquali was fumbling with the English

language, running the gauntlet for a passport, and spending the money that his brother had sent him from Coalgate to buy passage to the United States. No one ever wanted to leave the fatherland more than he; Pasquali had visualized no opportunity in the lands of Italy for a sheepherder.

Starting From Scratch

In the United States he found it so different. Here, personal initiative really counted; one actually could do according to his own choosing and make the most out of it. August started the hard way. First he was a coal miner, digging coal, and in this way paid his brother for the ticket to this new freedom. From 1911 he worked in the mines and during the first World War he was employed as "shotman," very dangerous mine work. The pick and shovel and the coal dust were good enough for a while, but here one did not have to dig coal always, unless one wanted to. August put in a small store and began selling groceries, meats, and milk to his fellow miners, but always he had to buy the meat and the milk; sometimes the quality was not so good. Why, he thought, could he not produce them himself. In 1920 Pasquali bought a farm.

Then it was just an ordinary farm, a piece of land owned and farmed by others for more than 40 years—land that already had suffered from soil depletion and soil erosion. The problem of operating the farm was so completely different from anything that Pasquali had previously done that he had to learn everything from the very beginning. It kindled in his mind a hunger for knowledge about agriculture. Again he thought, why could not anybody get this information when the Department of Agriculture had made it so easy, with a county farm agent right there in Coalgate. From the county agent August had his first insight into the complications of agriculture.

Other farmers were contented to farm as their fathers had, but August observed that their methods were not those outlined by the Department of Agriculture. The soil was washing away; everybody knew it, but few did anything about it.

"Why let the land wash away and be destroyed by gullies when terracing will protect the soil?" asked the county agent.

August was convinced, and they went to the farm with rod and level. He began building a terrace wherever a stake was set. Lee Craig became county farm agent, and the farm building program went on. Then in the rain, neighbors recall, August could be seen with slicker about his shoulders, shovel in hand, wandering over the fields to see that each terrace was doing its work and that every row, which ran with the terraces, was holding that vital rain water where it fell.

One day August pulled up a chair to the county agent's desk and said apologetically, "Mr. Craig, my alfalfa all died!"

"What have you been trying to do?" exclaimed the agent, "Alfalfa will not grow on those upland soils of yours."

"Why not," questioned August, "Can't we make soil grow it?"

Out to the farm again, went August and, this time, Mr. Craig. They went carefully over the field and gathered samples of the soil. Many things were found to be wrong. The soil was acid in reaction, low in lime, low in organic matter, and very low in phosphates.

"That Crazy Italian"

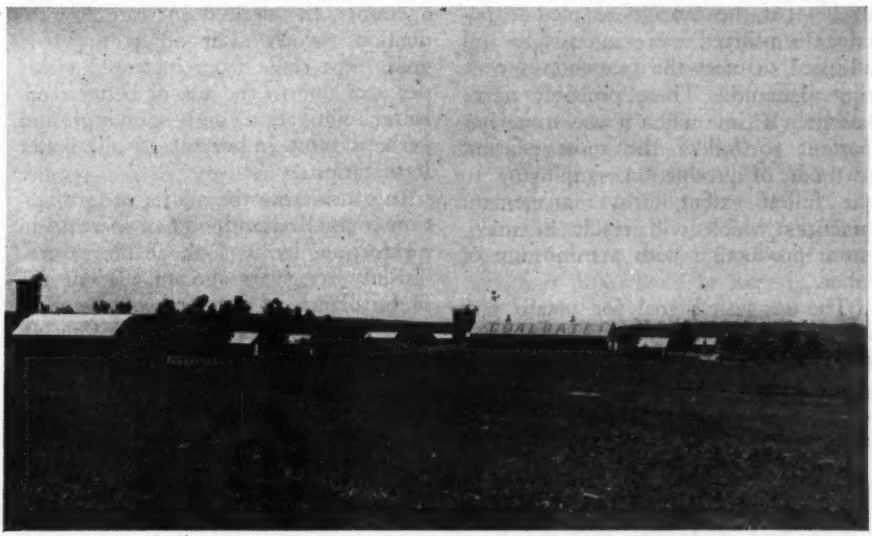
Then August Pasquali began another venture. He began adding minerals to the soil—the very minerals that had been removed by soil erosion and soil depletion. First he added lime, tons and tons of it, to counteract soil acidity. Then later he added, according to instructions, sack after sack of phosphate fertilizer. He applied all the manure from the barn and even

got some from neighboring farms where it would not be used. Some of his neighbors disapproved by saying, "That Italian is crazy—costs more'n it's worth to go haul and spread that manure."

A couple of years later August had good alfalfa where alfalfa never grew before. He was headed in the right direction, working with nature, adding those things which had been robbed from the soil and also protecting it from soil erosion. Many farmers were contented to grow cane, a low protein feed, when their soils would no longer grow corn, but not Pasquali. He was not satisfied with less than alfalfa.

bought more livestock. He kept going, this way, until he owned and operated a square mile of farm and ranch land stocked with cattle and hogs. Actually his business had grown beyond his own imagination. His farm was paying off, and paying off well. The store was paying off, too, because the people of Coalgate were buying his quality products grown on his farm.

Few farms have more finger-tip, labor-saving devices than this one. Pasquali feeds 100 hogs in one minute. This feeding process begins in the milk house where skimmed milk, spilled from the separator into an upright pipe, is picked up by compressed air and



Farmstead as seen from the highway looking toward the southeast. A large farm pond is behind barn on the left. Terraces are visible in foreground.

Increased yield in everything was his reward. He needed more livestock to use up the feed. The livestock needed protection. The building program started, big barn and silo, a barn for the beef cattle, another for the dairy cattle, one for the hogs, and a manure pit so that everything could be held and returned to the soil.

August Pasquali never seemed to make things come out even. He had either too much livestock and bought more land or had too much land and

shoved 800 feet up the hill and poured into a square concrete tank in the center of the long hog barn. Later the grain mix is dumped in. When the swill is ready for feeding, two eight-inch gate valves are opened and the swill is allowed to spill into long hog troughs. It takes only a minute, but that is long enough to feed 100 hogs and each has a chance to get his share of the feed.

Most striking feature on the Pasquali

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Efficient Fertilizers For Potato Farms

By S. D. Gray

Washington, D. C.

THE nation's commercial potato farms are rapidly approaching 100 per cent production capacity, if measured by the number of acres utilized. Even greater capacity may be expected in 1944, if the acreage adapted to potatoes is utilized more intensively and adjusted to meet the tremendous wartime demand. There probably never has been a time when it was more important to follow the most efficient methods of production, employing to the fullest extent farm management practices which will result in maximum production with a minimum of labor.

The suggested goal for potato production in 1944 is 3,519,000 acres for the country as a whole. This represents an increase over 1943 of approximately 2 per cent.

Increased Production

In the achievement of the increased acreage and production goals that have been established in the face of a scarcity of labor, machinery, and other essentials, there will be need for clear thinking and planning. Those in authority have a big responsibility. To the layman, the mere increase in acreage presents no problem. To the man of experience, however, it becomes a matter of great concern. He knows that the large commercial growers already have under cultivation about the maximum number of acres adapted to potatoes that their farms will permit. He knows that the small growers cannot greatly expand their acreage, even if well adapted, because of prevailing restrictions on machinery and equipment that would be needed. While undoubtedly much of the acreage increase will have to come from the larger group of small operators, the desired increase in production, which after all is the true goal, must come from increased yields per acre due to the use of better seed, better cultivation and spraying, and perhaps most important of all, better fertilization.

In considering the matter of fertilization from the standpoint of increase in production, let us look at the record. Twenty-five years ago an efficient use of fertilizers on potatoes could not be fully realized because of lack of a suitable planter-distributor. The small-acreage farmers opened the rows with a one-horse plow or other tool, applied the fertilizer by hand, dragged a chain or cultivator through the furrow to mix the fertilizer, dropped the potatoes by hand, and covered with a plow or cultivator. The so-called commercial grower if he were progressive may have used the old Eureka two-row fertilizer-distributor marker which marked out the rows and applied the fertilizer. He then followed with a horse-drawn potato planter. In either case, the seed piece was in such close contact with the fertilizer that injury was frequently serious. Under such conditions, growers became indifferent to the use of fertilizer and this was reflected in low average yields as well as farm income.

With the development of the combination planter-distributor, to which the late Fred H. Bateman of the Iron

Age Equipment Company gave so much of his life, the use of commercial fertilizers for potatoes took on a new significance. The pioneering of Mr. Bateman in the perfection of the band method of applying fertilizer not only made it possible to increase potato yields by more liberal use of fertilizer, but served to stimulate enormously the growth and expansion of the industry. Today, almost every potato grower boasts of at least one modern potato planter, and no longer does he harbor that old-time fear of injury from fertilizer use. Applications of high analysis fertilizers in amounts varying from 1,000 to 2,500 pounds per acre are not uncommon in many important potato-growing areas.

Methods of Fertilizer Application

When the band method of application was first developed, potato fertilizers seldom carried more than 16 units of plant food. One of the very popular mixtures at that time was a 4-8-5, and much smaller amounts per acre were applied than today. Little by little research work at the agricultural experiment stations not only showed that larger amounts of fertilizer could be used with safety, but that potatoes definitely needed more potash than was ordinarily used. In most of the official recommendations of today, potato analyses carry from two to three times as much potash as nitrogen, and usually the phosphorus content of the mixtures is intermediate between nitrogen and potash. In areas where potatoes are grown in a grain-hay rotation, it is generally believed that potato mixtures should have about equal amounts of phosphorus and potash, especially when the rate of application is on the average less than 1,000 pounds per acre.

As larger amounts of fertilizer per acre and higher potash ratios have been established by research, some difficulties have been encountered, even where the approved band-application method has been employed. Occasionally, on soils low in organic matter or in seasons of low rainfall, during the early stages of growth fertilizer injury has been observed quite frequently. Realizing that high yields depend upon abundant fertilizer in the right ratios, yet conscious of the fact that the full benefit from its use cannot be realized when injury is being sustained, scientists have been prompted to continue their research on methods of application. The band principle having made such contributions to this field in the beginning, the first thought was to modify it in such a way as to place a part of the fertilizer somewhat deeper in one band than in the other. Results of these approaches have been extremely encouraging and it is now possible when purchasing a planter to secure fertilizer attachments designed to place part of the fertilizer in a shallow band and part several inches deeper. Commercially the attachments are called Hi-Lo.

To all intents and purposes the Hi-Lo attachment for applying fertilizer is just about perfect. It does not, however, work too well in rocky or rooty soil, and this should be kept in mind. To abridge this difficulty and at the same time avail ourselves of the obvious advantages of the Hi-Lo principle of fertilizer application, scientists have further modified their experimental plans. In this work fertilizer placement studies have been quite generally about as follows:

1. Ordinary equal depth bands two inches to each side and slightly below the level of the seed piece.
2. Hi-Lo varying the proportions of the fertilizer in each band.
3. Drilling the fertilizer deep with grain drill.
4. Broadcasting varying amounts of the total fertilizer application before plowing with balance in bands at planting time.
5. Plow-sole (furrow) application of varying amounts of the total application by using the I.H.C. plow-under attachment with the balance in bands at planting time.

Results of these approaches have been of tremendous value and interest. Briefly, it might be concluded that with ideal moisture conditions during the early growth period the equal depth band placement of fertilizer is entirely satisfactory. However, since no one can anticipate or predict ideal moisture conditions, the modified Hi-Lo band-placement method is more certain and should certainly be employed where soil conditions permit. Because Hi-Lo does not work too satisfactorily where there are many stones, roots, or coarse debris as in old tufted sods, plowing under from one-half to three-fourths of the total fertilizer with the balance in bands at planting time would seem to offer the best opportunity for increased yields under average conditions of soils and rainfall. Broadcasting or drilling the fertilizer has not been found advantageous.

Of interest perhaps at this point would be a summary of four years of fertilizer demonstrations conducted by the writer in cooperation with the Pennsylvania Cooperative Potato Growers' Association for the period between 1937-1940 and published in the January 1941 issue of "The Guide Post." This work conducted on 12 typical potato farms, representative of the important potato-growing sections of the State, is presented in condensed form in Table I.

In 1942, fertilizer tests were conducted at the National Farm School, Doylestown, Pennsylvania, and at the Philadelphia County Prison Farm near Torresdale, Pennsylvania. In the tests at Doylestown plots 1, 2, and 3, Table II, had all fertilizer applied by the band method. On plot 4, 800 pounds of the fertilizer were broadcast and plowed down with 200 pounds in bands at planting time. On one-half of each plot 200 pounds of muriate of potash were broadcast before the ground was plowed. The results speak for the treatments involved.

The decreases in yields in plots 2 and 3 were definitely attributable to fertilizer injury, but where 800 pounds were plowed under in plot 4, with only 200 pounds in bands at planting time, injury was avoided and the yields were significantly increased. Column 5 shows that where extra potash was

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TABLE I.—AVERAGE 4-YEAR RESULTS FOR PENNSYLVANIA POTATOES

Plot	Fertilizer*	Yield bu. per acre	Bushels increase over basic treatment
1	5–10–10.....	247.80	
2	Basic treatment plus 150 lbs. 60% muriate.	285.92	38.12
3	Basic treatment plus 300 lbs. 60% muriate.	259.60	11.80
4	0–10–10**.....	273.29	25.49

* Basic treatment in amount to supply 200 lbs. total plant food.

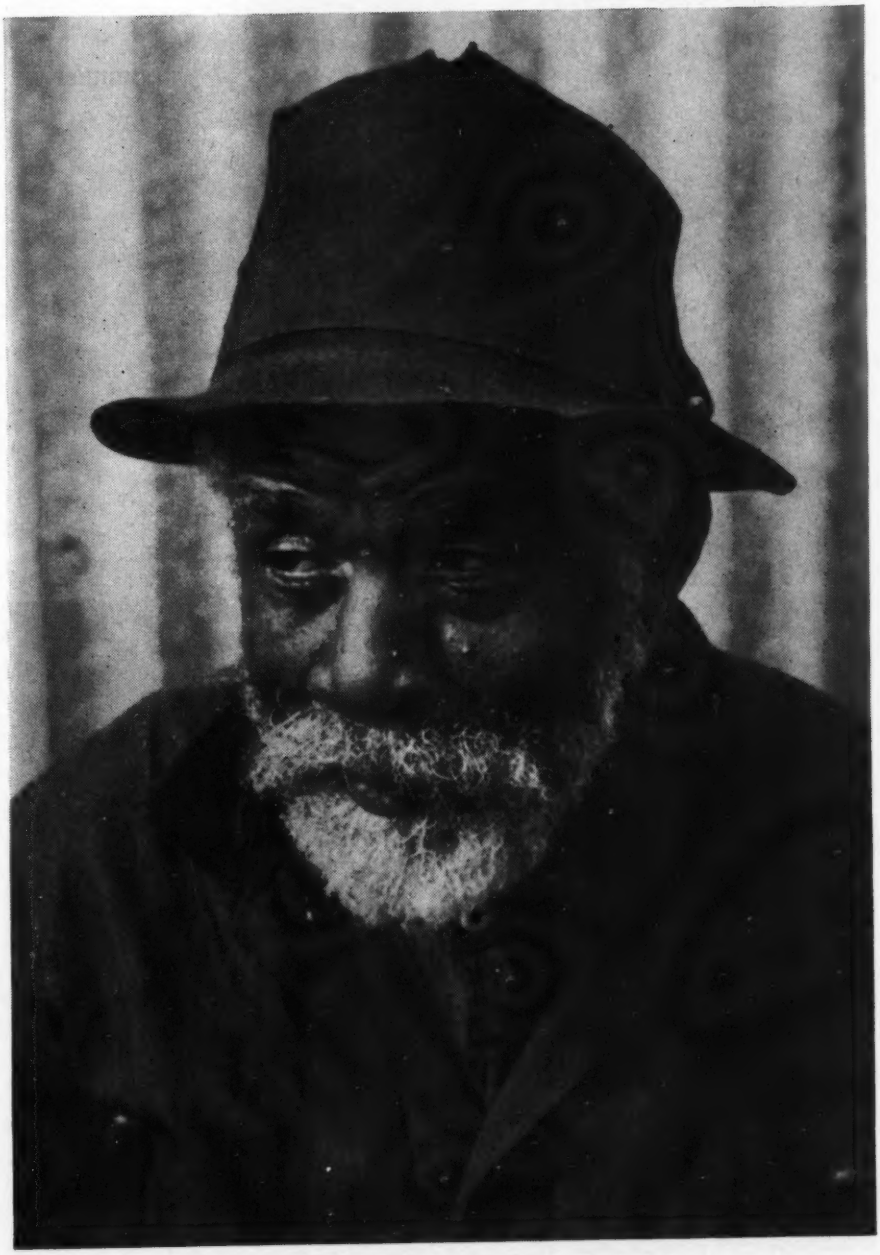
** Sufficient to raise 1:2:2 to a 1:3:3 ratio.

TABLE II.—1942 POTATO FERTILIZER EXPERIMENT, NATIONAL FARM SCHOOL, DOYLESTOWN, PENNSYLVANIA

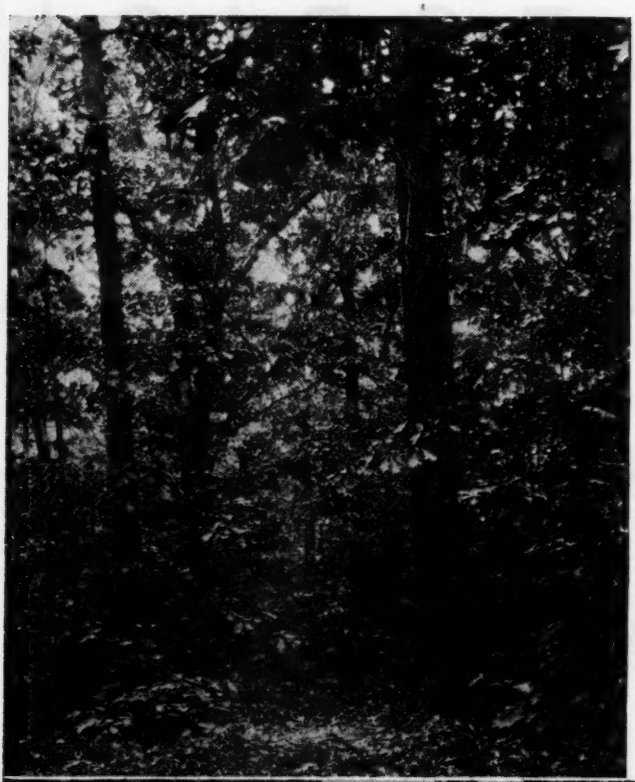
Plot	Fertilizer analyses	Rate applied	Yield—bushels per acre standard method	Yield—bushels per acre plus 200 lbs. muriate broadcast
1	4–8–8	1,000	177.8	202.2
2	4–12–12	1,000	158.5	180.4
3	4–16–16	1,000	155.8	215.9
4	4–12–12	1,000	215.9	174.9*

* This plot injured by water and so has no value.

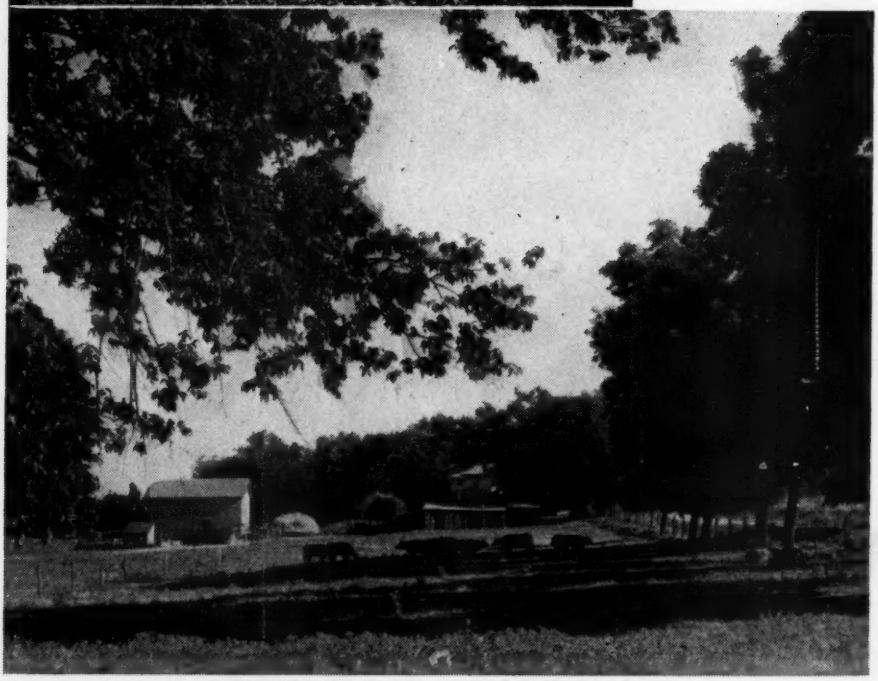
PICTORIAL



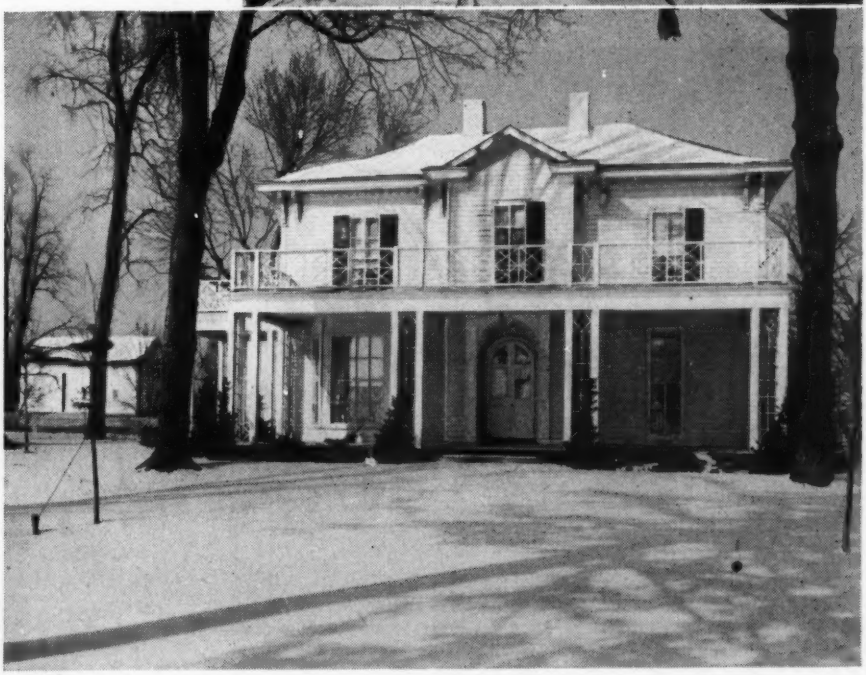
THE LOOK THAT COMES ONLY FROM EXPERIENCE



Summer



Winter



Future Farmers of Union high school, Canby, Oregon, recently made the final payment on $3802.50 worth of farm equipment, purchased during the past three years.

Above: Raymond Olson changes oil in the air cleaner on tractor before taking the machine home to use in an agriculture project. George Pope, F.F.A. advisor, checks on the job.

Below: Future Farmers watch their treasurer make out a check in payment for the Case combine harvester in the background.

The Editors Talk

American Agriculture To Get More Potash

With the approach of the planting season, concern over supplies of potash adequate to meet the huge 1944 production goals for food, feed, fibre, and oil-bearing crops has steadily increased. This concern did not arise from the possibility that any such situation as existed during World War I, when virtually no potash could be obtained and prices rose from $35 to $500 per ton, would be encountered. The American Potash Industry, developed since the last war, safeguards against a repetition of any such situation. Rather the concern stemmed from the fact that, due to Lend-Lease commitments and increased demands from the chemical industries, apparently there would be about 10% less potash than last year, available to properly balance the supplies of nitrogen and phosphoric acid which were being increased to meet the greater 1944 production goals.

The recent announcement of the War Production Board that approximately 200,000 tons additional potash salts were being allocated for fertilizer use in the United States, Puerto Rico, and Hawaii, therefore, was good news for American farmers. This Period 3 allocation is equivalent to about 100,000 tons K_2O and added to that previously allocated provides a total of 580,000 tons K_2O for American agriculture during the current crop year. This total exceeds by 25,000 tons K_2O the average of that delivered for agriculture during the preceding two crop years, the basis of allocations.

These additional supplies are the result of the cancellation of a part of Lend-Lease exports and added production through increased efficiencies on the part of the American Potash Industry. The tonnage is being delivered to the fertilizer industry for distribution to farmers.

For the greatly expanded chemical industries, there have been allocated nearly 100,000 tons K_2O, a four-fold increase over pre-war usage.

Canada is also sharing in the increased supply, being allocated a total of 39,000 tons K_2O for the year. Other exports, including Lend-Lease, have been given a total allocation of about 26,000 tons K_2O. The potash thus allocated during the 1943-1944 year exceeds 745,000 tons K_2O.

The details on the allocation are as follows:

TOTAL POTASH ALLOCATIONS 1943-44

	Short Tons K_2O
Agriculture in U. S., Puerto Rico, & Hawaii	580,027
Chemical Industries	99,723
Canada	39,000
Export	26,432
Total	745,182

BREAKDOWN OF AGRICULTURAL ALLOCATION

	Salts Tons	Equivalent K_2O Tons
60% Muriate	702,308	421,384
50% Muriate	97,334	48,667
Sulphates	141,112	51,915
Manure Salts	232,244	58,061
Total	1,172,998	580,027

These figures must have been good news also to the advisory forces who have consistently and conscientiously deprecated the lowering of potash in fertilizer formulas established and recommended after years of official research and experimental work. Even though some of the additional potash may be delivered too late for use in fertilizers that already have been mixed for early-season application, extra potash in many cases can be used as a top- or side-dressing to supplement low-potash analyses used at planting time. Thus can be brought into balance many of the mixtures which were made up under the earlier apprehensions of lower potash supplies.

Victory Gardens 1944

The first rounds in America's 1944 Victory Garden campaign have been fired. Goals have been announced; seed catalogs have been circulated; seed ordered early has been received; and fertilizers and insecticides have been assured.

Final reports on the "carry-through" by Victory Gardeners last year instill a belief that this year's goals will be met. Some 20 million gardens last year produced 8 million tons of vegetables or nearly one-half the total produced in the entire country. This year the call is for 22 million gardens—16 million urban and 6 million farm gardens. The value of the garden effort last year is valued at more than $2,000,000,000 of the Nation's food bill.

Recently announced was the fact that the civilian supply of canned fruits will be cut 43% and canned vegetables 19% during 1944. To those who met some discouragement with their gardens last year, this should give added impetus to work harder and overcome their mistakes. There is infinite satisfaction in triumph over difficulties, and as anyone with any experience knows, nothing connected with agriculture is a one-year proposition.

At its conference in Detroit, the National Victory Garden Institute adopted as its objectives for 1944:

1—22,000,000 Victory Gardens in 1944.

2—To encourage the preservation, storing, and conservation of home-grown and surplus vegetables and fruits with a goal of 26,000,000 home preserves in 1944.

3—A vegetable and fruit garden for every family that has suitable soil and a sunny site.

4—To encourage company, community, and school gardens wherever they can be successfully grown.

5—To supplement rather than to duplicate the efforts of existing agencies and organizations.

6—To act as a clearing-house for Victory Garden activities and information.

7—The encouragement of gardening as a recreation as well as a means of providing food and beauty.

That these objectives are most commendable is obvious; that they will be adopted by everyone interested in the welfare of his Nation, his community, and himself also is obvious. The Victory Garden campaign for 1944 is off to a good start.

"The production of food from the Victory Garden is not its only value. Victory Gardens save transportation; they save containers; they save manpower in many ways. All these are critical."—*Judge Marvin Jones, War Food Administrator.*

Farm Prices of Farm Products*

	Cotton Cents per lb.	Tobacco Cents per lb.	Potatoes Cents per bu.	Sweet Potatoes Cents per bu.	Corn Cents per bu.	Wheat Cents per bu.	Hay Dollars per ton	Cottonseed Dollars per ton	Truck Crops
1910–14 Average	12.4	10.4	69.6	87.6	64.8	88.0	11.94	21.59	....
1920	32.1	17.3	249.5	175.7	144.2	224.1	21.26	51.73	....
1921	12.3	19.5	103.8	118.7	58.7	119.0	12.96	22.18	....
1922	18.9	22.8	96.7	104.8	58.5	103.2	11.68	35.04	....
1923	26.7	19.0	84.1	104.4	80.1	98.9	12.29	43.69	....
1924	27.6	19.0	87.0	137.0	91.2	110.5	13.28	38.34	....
1925	22.1	16.8	113.9	171.6	99.9	151.0	12.54	35.07	....
1926	15.1	17.9	185.7	156.3	69.9	135.1	13.06	27.20	....
1927	15.9	20.7	132.3	114.0	78.8	120.5	12.00	28.56	....
1928	18.6	20.0	82.9	112.3	89.1	113.4	10.63	37.70	....
1929	17.7	18.6	93.7	118.4	87.6	102.7	11.56	34.98	....
1930	12.4	12.9	124.4	115.8	78.0	80.9	11.31	26.25	....
1931	7.6	8.2	72.7	92.9	49.8	48.8	9.76	17.04	....
1932	5.8	10.5	43.3	57.2	28.1	38.8	7.53	9.74	....
1933	8.1	12.9	66.0	59.4	36.5	58.1	6.81	12.32	....
1934	12.0	17.1	68.0	79.1	61.3	79.8	10.67	26.12	....
1935	11.6	16.1	49.4	73.9	77.4	86.4	10.57	35.56	....
1936	11.7	17.2	99.6	85.3	76.7	96.0	8.93	31.78	....
1937	11.1	19.9	88.3	91.8	94.8	107.1	10.36	30.24	....
1938	8.3	17.2	55.5	76.9	49.0	66.1	7.55	21.13	....
1939	8.7	13.6	68.1	75.4	47.6	63.6	6.95	22.17	....
1940	9.6	15.1	70.7	85.2	59.0	73.9	7.62	24.31	....
1941	13.3	19.1	64.6	94.4	64.3	84.0	8.10	35.04	....
1942	18.51	28.3	110.0	108.3	79.5	101.8	10.05	44.42	....
1943									
January	19.74	35.1	117.8	121.4	88.0	117.5	11.20	44.34	....
February	19.68	18.2	125.7	129.8	90.4	119.5	11.94	44.88	....
March	19.91	16.0	145.1	153.6	94.8	122.7	12.28	45.73	....
April	20.13	16.0	166.8	179.2	100.2	122.3	12.61	45.89	....
May	20.09	37.6	190.7	225.1	103.4	122.8	12.66	46.11	....
June	19.96	57.0	188.0	222.0	106.0	124.0	12.20	46.40	....
July	19.60	59.0	167.0	267.0	108.0	126.0	11.90	44.50	....
August	19.81	38.4	159.0	276.0	109.0	127.0	12.20	50.90	....
September	20.20	37.2	134.0	231.0	109.0	130.0	12.90	51.90	....
October	20.28	41.8	128.0	196.0	107.0	135.0	13.70	52.50	....
November	19.40	44.5	133.0	177.0	105.0	137.0	14.50	52.50	....
December	19.85	42.4	135.0	188.0	111.0	143.0	15.20	52.60	....
1944									
January	20.15	41.5	141.0	202.0	113.0	146.0	15.70	52.30	....

Index Numbers (1910-14 = 100)

1920	259	166	358	201	223	255	178	240	....
1921	99	187	149	136	91	135	109	103	....
1922	152	219	139	120	90	117	98	162	....
1923	215	183	121	119	124	112	103	202	....
1924	223	183	125	156	141	126	111	177	150
1925	178	161	164	196	154	172	105	162	153
1926	122	172	267	178	108	154	109	126	143
1927	128	199	190	130	122	137	101	132	121
1928	150	192	119	128	138	129	89	175	159
1929	143	179	135	135	135	117	97	162	149
1930	100	124	179	132	120	92	95	122	140
1931	61	79	104	106	77	55	82	79	117
1932	47	101	62	65	43	44	63	45	102
1933	65	124	95	68	56	66	57	57	105
1934	97	164	98	90	95	91	89	121	104
1935	94	155	71	84	119	98	89	165	126
1936	94	165	143	97	118	109	75	147	113
1937	90	191	127	105	146	122	87	140	122
1938	67	165	80	88	76	75	63	98	101
1939	70	131	98	86	73	72	58	103	109
1940	78	145	102	97	91	84	64	126	121
1941	107	184	93	108	99	95	68	162	145
1942	149	272	158	124	123	116	84	206	199
1943									
January	159	338	169	139	136	134	94	205	215
February	159	175	181	148	140	136	100	208	301
March	161	154	208	175	146	139	103	212	302
April	162	154	240	205	155	139	106	213	291
May	162	362	274	257	160	140	106	214	253
June	161	548	270	253	164	141	102	215	308
July	158	567	240	305	167	143	100	206	315
August	160	369	228	315	168	144	102	236	308
September	163	358	193	264	168	148	108	240	311
October	164	402	184	224	165	153	115	243	264
November	156	428	191	202	162	156	121	243	254
December	160	408	194	215	171	163	127	244	208
1944									
January	163	399	203	231	174	166	131	242	231

Wholesale Prices of Ammoniates

	Nitrate of soda per unit N bulk	Sulphate of ammonia bulk per unit N	Cottonseed meal S. E. Mills per unit N	Fish scrap, dried 11-12% ammonia, 15% bone phosphate, f.o.b. factory, bulk per unit N	Fish scrap, wet acidulated, 6% ammonia, 3% bone phosphate, f.o.b. factory, bulk per unit N	Tankage 11% ammonia, 15% bone phosphate, f.o.b. Chicago, bulk, per unit N	High grade ground blood, 16-17% ammonia, Chicago, bulk, per unit N
1910–14	$2.68	$2.85	$3.50	$3.53	$3.05	$3.37	$3.52
1922	3.04	2.58	6.07	4.66	3.54	4.75	4.99
1923	3.02	2.90	6.19	4.83	4.25	4.59	5.16
1924	2.99	2.44	5.87	5.02	4.41	3.60	4.25
1925	3.11	2.47	5.41	5.34	4.71	3.97	4.75
1926	3.06	2.41	4.40	4.95	4.15	4.36	4.90
1927	3.01	2.26	5.07	5.87	4.35	4.32	5.70
1928	2.67	2.30	7.06	6.63	5.28	4.92	6.00
1929	2.57	2.04	5.64	5.00	4.69	4.61	5.72
1930	2.47	1.81	4.78	4.96	4.15	3.79	4.58
1931	2.34	1.46	3.10	3.95	3.33	2.11	2.46
1932	1.87	1.04	2.18	2.18	1.82	1.21	1.36
1933	1.52	1.12	2.95	2.86	2.58	2.06	2.46
1934	1.52	1.20	4.46	3.15	2.84	2.67	3.27
1935	1.47	1.15	4.59	3.10	2.65	3.06	3.65
1936	1.53	1.23	4.17	3.42	2.67	3.58	4.25
1937	1.63	1.32	4.91	4.66	3.65	4.04	4.80
1938	1.69	1.38	3.69	3.76	3.17	3.15	3.53
1939	1.69	1.35	4.02	4.41	3.12	3.87	3.90
1940	1.69	1.36	4.64	4.36	3.35	3.33	3.39
1941	1.69	1.41	5.50	5.32	3.27	3.76	4.43
1942	1.74	1.41	6.11	5.77	3.34	5.04	6.76
1943							
January	1.75	1.42	5.68	5.77	3.34	4.86	6.53
February	1.75	1.42	5.83	5.77	3.34	4.86	6.53
March	1.75	1.42	6.30	5.77	3.34	4.86	6.53
April	1.75	1.42	6.29	5.77	3.34	4.86	6.53
May	1.75	1.42	6.29	5.77	3.34	4.86	6.53
June	1.75	1.42	6.30	5.77	3.34	4.86	6.53
July	1.75	1.42	6.30	5.77	3.34	4.86	6.71
August	1.75	1.42	6.30	5.77	3.34	4.86	6.71
September	1.75	1.42	6.30	5.77	3.34	4.86	6.71
October	1.75	1.42	6.29	5.77	3.34	4.86	6.71
November	1.75	1.42	6.29	5.77	3.34	4.86	6.71
December	1.75	1.42	7.39	5.77	3.34	4.86	6.71
1944							
January	1.75	1.42	7.40	5.77	3.34	4.86	6.71

Index Numbers (1910-14 = 100)

1922	113	90	173	132	117	140	142
1923	112	102	177	137	140	136	147
1924	111	86	168	142	145	107	121
1925	115	87	155	151	155	117	135
1926	113	84	126	140	136	129	139
1927	112	79	145	166	143	128	162
1928	100	81	202	188	173	146	170
1929	96	72	161	142	154	137	162
1930	92	64	137	141	136	112	130
1931	88	51	89	112	109	63	70
1932	71	36	62	62	60	36	39
1933	59	39	84	81	85	97	71
1934	59	42	127	89	93	79	93
1935	57	40	131	88	87	91	104
1936	59	43	119	97	89	106	121
1937	61	46	140	132	120	120	122
1938	63	48	105	106	104	93	100
1939	63	47	115	125	102	115	111
1940	63	48	133	124	110	99	96
1941	63	49	157	151	107	112	126
1942	65	49	175	163	110	150	192
1943							
January	65	50	162	163	110	144	186
February	65	50	167	163	110	144	186
March	65	50	180	163	110	144	186
April	65	50	180	163	110	144	186
May	65	50	180	163	110	144	186
June	65	50	180	163	110	144	186
July	65	50	180	163	110	144	191
August	65	50	180	163	110	144	191
September	65	50	180	163	110	144	191
October	65	50	180	163	110	144	191
November	65	50	180	163	110	144	191
December	65	50	211	163	110	144	191
1944							
January	65	50	211	163	110	144	191

Wholesale Prices of Phosphates and Potash**

	Superphosphate Baltimore, per unit	Florida land pebble 68% f.o.b. mines, bulk, per ton	Tennessee phosphate rock, 75% f.o.b. mines, bulk, per ton	Muriate of potash bulk, per unit, c.i.f. Atlantic and Gulf ports	Sulphate of potash in bags, per unit, c.i.f. Atlantic and Gulf ports	Sulphate of potash magnesia, per ton, c.i.f. Atlantic and Gulf ports	Manure salts bulk, per unit, c.i.f. Atlantic and Gulf ports[1]	Kainit, 20% bulk, per unit, c.i.f. Atlantic and Gulf ports[1]
1910–14.....	$0.536	$3.61	$4.88	$0.714	$0.953	$24.18	$0.657	$0.655
1922.....	.566	3.12	6.90	.632	.904	23.87	....	.508
1923.....	.550	3.08	7.50	.588	.836	23.32	....	.474
1924.....	.502	2.31	6.60	.582	.860	23.72	....	.472
1925.....	.600	2.44	6.16	.584	.860	23.72	....	.483
1926.....	.598	3.20	5.57	.596	.854	23.58	.537	.524
1927.....	.535	3.09	5.50	.646	.924	25.55	.586	.581
1928.....	.580	3.12	5.50	.669	.957	26.46	.607	.602
1929.....	.609	3.18	5.50	.672	.962	26.59	.610	.605
1930.....	.542	3.18	5.50	.681	.973	26.92	.618	.612
1931.....	.485	3.18	5.50	.681	.973	26.92	.618	.612
1932.....	.458	3.18	5.50	.681	.963	26.90	.618	.591
1933.....	.434	3.11	5.50	.662	.864	25.10	.601	.565
1934.....	.487	3.14	5.67	.486	.751	22.49	.483	.471
1935.....	.492	3.30	5.69	.415	.684	21.44	.444	.488
1936.....	.476	1.85	5.50	.464	.708	22.94	.505	.560
1937.....	.510	1.85	5.50	.508	.757	24.70	.556	.607
1938.....	.492	1.85	5.50	.523	.774	25.17	.572	.623
1939.....	.478	1.90	5.50	.521	.751	24.52	.570	.607
1940.....	.516	1.90	5.50	.517	.730	....	.573	....
1941.....	.547	1.94	5.64	.522	.779	25.55	.570	....
1942.....	.600	2.13	6.29	.522	.809	25.74	.205	....
1943								
January.....	.600	2.00	5.90	.535	.817	26.00	.210	....
February....	.600	2.00	5.90	.535	.817	26.00	.210	....
March.....	.608	2.00	5.90	.535	.817	26.00	.210	....
April.....	.640	2.00	5.90	.535	.817	26.00	.210	....
May.....	.640	2.00	5.90	.535	.817	26.00	.210	....
June.....	.640	2.00	5.90	.471	.701	22.88	.176	....
July.....	.640	2.00	5.90	.503	.797	26.00	.188	....
August.....	.640	2.00	5.90	.503	.797	26.00	.188	....
September..	.640	2.00	5.90	.503	.797	26.00	.188	....
October.....	.640	2.00	5.90	.535	.797	26.00	.200	....
November...	.640	2.00	5.90	.535	.797	26.00	.200	....
December...	.640	2.00	6.10	.535	.797	26.00	.200	....
1944								
January.....	.640	2.00	6.10	.535	.797	26.00	.200	....

Index Numbers (1910-14 = 100)

1922.....	106	87	141	89	95	99	....	78
1923.....	103	85	154	82	88	96	....	72
1924.....	94	64	135	82	90	98	....	72
1925.....	110	68	126	82	90	98	....	74
1926.....	112	88	114	83	90	98	82	80
1927.....	100	86	113	90	97	106	89	89
1928.....	108	86	113	94	100	109	92	92
1929.....	114	88	113	94	101	110	93	92
1930.....	101	88	113	95	102	111	94	93
1931.....	90	88	113	95	102	111	94	93
1932.....	85	88	113	95	101	111	94	90
1933.....	81	86	113	93	91	104	91	86
1934.....	91	87	110	68	79	93	74	72
1935.....	92	91	117	58	72	89	68	75
1936.....	89	51	113	65	74	95	77	85
1937.....	95	51	113	71	79	102	85	93
1938.....	92	51	113	73	81	104	87	95
1939.....	89	53	113	73	79	101	87	93
1940.....	96	53	113	72	77	....	87	....
1941.....	102	54	110	73	82	106	87	....
1942.....	112	59	129	73	85	106	84	....
1943								
January.....	112	55	121	75	86	108	85	....
February....	112	55	121	75	86	108	85	....
March.....	113	55	121	75	86	108	85	....
April.....	119	55	121	75	86	108	85	....
May.....	119	55	121	75	86	108	85	....
June.....	119	55	121	66	74	95	80	....
July.....	119	55	121	70	84	108	82	....
August.....	119	55	121	70	84	108	82	....
September..	119	55	121	70	84	108	82	....
October.....	119	55	121	75	84	108	83	....
November...	119	55	121	75	84	108	83	....
December...	119	55	125	75	84	108	83	....
1944								
January.....	119	55	125	75	84	108	83	....

Combined Index Numbers of Prices of Fertilizer Materials, Farm Products and All Commodities

	Farm prices*	Prices paid by farmers for commodities bought*	Wholesale prices of all commodities†	Fertilizer materials‡	Chemical ammoniates	Organic ammoniates	Superphosphate	Potash
1922.....	132	149	141	116	101	145	106	85
1923.....	142	152	147	114	107	144	103	79
1924.....	143	152	143	103	97	125	94	79
1925.....	156	157	151	112	100	131	109	80
1926.....	145	155	146	119	94	135	112	86
1927.....	139	153	139	116	89	150	100	94
1928.....	149	155	141	121	87	177	108	97
1929.....	146	153	139	114	79	146	114	97
1930.....	126	145	126	105	72	131	101	99
1931.....	87	124	107	83	62	83	90	99
1932.....	65	107	95	71	46	48	85	99
1933.....	70	109	96	70	45	71	81	95
1934.....	90	123	109	72	47	90	91	72
1935.....	108	125	117	70	45	97	92	63
1936.....	114	124	118	73	47	107	89	69
1937.....	121	130	126	81	50	129	95	75
1938.....	95	122	115	78	52	101	92	77
1939.....	93	121	112	79	51	119	89	77
1940.....	98	122	115	80	52	114	96	77
1941.....	122	130	127	86	56	130	102	77
1942.....	157	152	144	93	57	161	112	77
1943								
January...	181	160	148	92	57	154	112	79
February..	178	162	149	92	57	155	112	79
March.....	182	163	150	93	57	160	113	79
April.....	185	165	151	95	57	160	119	79
May.....	187	167	152	95	57	160	119	79
June.....	190	168	151	93	57	160	119	69
July.....	188	169	150	94	57	160	119	74
August....	193	169	150	94	57	160	119	74
September.	193	169	150	94	57	160	119	74
October...	192	170	150	95	57	160	119	78
November.	194	171	150	95	57	160	119	78
December..	196	173	150	96	57	171	119	78
1944								
January....	196	174	150	96	57	171	119	78

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* U. S. D. A. figures.

† Department of Labor index converted to 1910-14 base.

‡ The Index numbers of prices of fertilizer materials are based on original study made by the Department of Agricultural Economics and Farm Management, Cornell University, Ithaca, New York. These indexes are complete since 1897. The series was revised and reweighted as of March 1940 and November 1942.

[1] Beginning with June 1941, manure salts prices are F. O. B. mines, the only basis now quoted.

**** The annual average of potash prices is higher than the weighted average of prices actually paid because since 1926 better than 90% of the potash used in agriculture has been contracted for during the discount period. From 1937 on, the maximum seasonal discount has been 12%.**

REVIEWS

This section contains a short review of some of the most practical and important bulletins, and lists all recent publications of the United States Department of Agriculture, the State Experiment Stations, and Canada, relating to Fertilizers, Soils, Crops, and Economics. A file of this department of BETTER CROPS WITH PLANT FOOD would provide a complete index covering all publications from these sources on the particular subjects named.

Fertilizer

"Fifth Annual Report of the Arizona Fertilizer Control Office," Agr. Exp. Sta., Univ. of Ariz., Tucson, Ariz., Sp. Bul., Feb. 1943.

"A Study of Ammonia and Nitrate Nitrogen for Cotton," Ga. Exp. Sta., Experiment, Ga., Bul. 229, Nov. 1943, K. T. Holley and T. G. Dulin.

"Ammonium Nitrate as a Fertilizer for Georgia Soils," Ga. Exp. Sta., Experiment, Ga., Press Bul. 531, Jan. 17, 1944, L. C. Olson.

"Fertilizers for South Georgia Field Crops in 1944," Ga. Coastal Plain Exp. Sta., Tifton, Ga., Mimeo. Paper No. 25, Dec. 28, 1943.

"Food Production for War, Fertilizers Help Reach War Crop Goals," Agr. Exp. Sta., Univ. of Idaho, Moscow, Idaho, War Cir. No. 4, H. W. E. Larson.

"Fertilizer Recommendations for Spring Planted Crops in Indiana," Purdue Univ. Agr. Exp. Sta., Lafayette, Ind., Ser. Leaf. 243, Rev., Jan. 1944.

"Inspection of Commercial Fertilizers and Agricultural Lime Products," Agr. Exp. Sta., Amherst, Mass., Bul. 118, Sept. 1943.

"Fertilizer Recommendations for 1944," Mich. State College, Ext. Div., East Lansing, Mich., E. Bul. 159 (Rev.), Jan. 1944.

"Analyses of Commercial Fertilizers, Manures and Agricultural Lime, 1942," N. J. Agr. Exp. Sta., Rutgers Univ., New Brunswick, N. J., Insp. Series 10, Dec. 1942, Charles S. Cathcart.

"1944 War-Time Fertilizers for Spring-Sown Crops, Permanent Pastures, and Hay Fields," Agr. Exp. Sta., Ohio State Univ., Columbus, Ohio, E. Bul. 231, Rev. Jan. 1944, Earl Jones and Robert E. Yoder.

"Consumption of Fertilizer Materials and Grades in Oklahoma," Agr. Exp. Sta., Okla. A. & M. College, Stillwater, Okla., E. Bul. No. B-273, Nov. 1943, Horace J. Harper.

"Spreading Lime with Manure," Vt. Agr. Exp. Sta., Univ. of Vt., Burlington, Vt., Pamphlet No. 6, May 1943, A. R. Midgley and D. E. Dunklee.

"Use Phosphates to Produce More Feed," Agr. Ext. Serv., State College of Wash., Pullman, Wash., E. Cir. 65, Aug. 1943, I. M. Ingham.

"Use of Fertilizers in 1944," Ext. Serv., Univ. of Wis., Madison, Wis., Sp. Cir., Dec. 1943, Emil Truog and C. J. Chapman.

Crops

¶ The importance of the soybean crop has greatly increased under the agricultural war programs of the country. The high value of the crop for the production of edible oils and animal feed causes it to be considered of great strategic value and has led agricultural planners to call for such large increases in production that they could be met only by greatly expanding the acreage devoted to the crop, although efforts to increase yields per acre have not been neglected. Since soybeans are a vigorously growing legume, adapted to survival on soils lower in fertility than most legumes require, at one time the crop was considered a very valuable soil-conserving crop. Work by the Soil Conservation Service and other agencies later showed that this was by no means universally the case. It was found that under many conditions, soils growing legumes seemed to be subject to erosion about as bad as most cultivated crops, and in common with other legumes, their high mineral content caused them to be soil-depleting so far as the mineral nutrients, calcium, phosphorus, potassium, and magnesium, were concerned. They were soil-conserving or soil-building only so far as nitrogen was concerned, and if plowed under, they usually but not always were beneficial to the following crops. Investigations have shown how most, if not all, of the problems can be overcome, in most cases with little or no additional trouble in growing the crop and usually giving higher yields for the care and attention given to using improved methods.

¶ A useful publication that should be

read by all soybean growers in Missouri and surrounding states, if not in all soybean-producing states, was prepared by D. D. Smith, as Missouri Agricultural Experiment Station Bulletin 469, "Soybeans and Soil Conservation." Considerable space is devoted to showing methods of overcoming the erosion problem in connection with the growing of soybeans. Experiments showed that growing the crop in 8-inch rows usually reduced surface run-off of rainfall and soil erosion and increased yields, as compared to growing the crop in 42-inch rows. Even under the best of conditions, however, there still was considerable surface run-off of rainfall and erosion. Growing the crop on the contour further reduced losses and erosion, and on the average increased the yield. It was found that the place in the rotation in which the soybeans were grown had considerable influence on erosion losses. If soybeans followed corn or some other cultivated crop, it was noticed that the erosion was much more severe on the soybeans than if they followed sod or a small grain. This led to the recommendation by the author that soybeans be grown as a substitute for, and not in addition to, corn in the rotation. A very good rotation for controlling erosion was winter barley and soybeans. The winter barley can be seeded under Missouri conditions the latter part of August, and it will make sufficient growth to furnish a good cover during the winter. It is then pastured in the spring and turned under for soybeans before being plowed under in preparation for the soybean crop. This works very well when the soybeans are cut for hay, although at times when grown for grain, they are harvested too late to permit a good stand of small grain to be obtained in the fall. Rye or winter wheat, if sown early, also would be satisfactory, but when winter wheat is sown after the fly-free date, it does not make a satisfactory cover crop following soybeans.

So far as soil fertility relationships are concerned, lime has been found of great importance in growing the soybeans in Missouri. In addition to lime, phosphate and potash usually are needed for best results, 0-20-10 and 0-20-20 giving favorable and significant increases in yield. In some of the work reported, plowing under the fertilizer or placing it in bands on the plow-sole gave better results than applying it near the surface in bands alongside the seed. In other work where the soybeans were grown during a wet spring season, placing the fertilizer near the surface of the soil gave equal or slightly better results than applying it deeply. In general, however, the author appears to favor the deep placement of the fertilizer.

"Pasture Studies with Calves on Winter Forage Crops at Casa Grande, Arizona," Agr. Exp. Sta., Univ. of Ariz., Tucson, Ariz., Mimeo. Report 47, July 1942, E. B. Stanley and Max E. Robinson.

"A Report to the Citrus Growers of Arizona on Better Navel Orange Fruiting," Agr. Exp. Sta., Tucson, Ariz., Mimeo. Report 50, Jan. 1943, Alton H. Finch.

"Field Bean Production Without Irrigation in Colorado," Agr. Exp. Sta., Fort Collins, Colo., Bul. 482, Sept. 1943, J. F. Brandon, D. W. Robertson, A. M. Binkley, and W. A. Kreutzer.

"Pasture Investigations (Tenth Report)," Agr. Exp. Sta., Univ. of Conn., Storrs, Conn., Bul. 245, March 1943, B. A. Brown and R. I. Munsell.

"Influence of Time-of-Planting and Spacing on the Yield of Porto Rico and Triumph Sweet Potatoes," Ga. Exp. Sta., Experiment, Ga., Bul. 230, Dec. 1943, H. L. Cochran.

"Food Production for War, Field Pea Production," Ext. Serv., Univ. of Idaho, Moscow, Idaho, War Cir. No. 7, K. H. W. Klages.

"Food Production for War, Herb Crops for Idaho," Ext. Serv., Univ. of Idaho, Moscow, Idaho, War Cir. No. 11, 1943.

"Food Production for War, Commercial Corn Hybrids," Ext. Serv., Univ. of Idaho, Moscow, Idaho, War Cir. No. 14, Herman K. Schultz.

"Food Production for War, Carrot Seed Production," Ext. Serv., Univ. of Idaho, Moscow, Idaho, War Cir. No. 16, George W. Woodbury.

"Pruning Suggestions for Indiana Apple Orchards," Ext. Serv., Purdue Univ., Lafayette, Ind., E. Bul. 160 (2nd Rev.), July 1943, C. L. Burkholder and Monroe McCown.

"Strawberries for Home and Market," Ext. Serv., Purdue Univ., Lafayette, Ind., E. Bul. 174, (5th Rev.), Aug. 1943, Monroe McCown, Clarence E. Baker, J. J. Davis, R. C. Baines, and G. E. Lehker.

"The Performance of Hybrid Corn in 1943,"

Agr. Exp. Sta., Univ. of Md., College Park, Md., Mis. Publ. 19, Dec. 1943, R. G. Rothgeb.

"For a Banner Crop Grow Vicland, Tama Better Oats," Ext. Serv., Univ. Farm, St. Paul 8, Minn., E. Pamphlet 129, Dec. 1943.

"Maturity Ratings of Corn Hybrids Registered for Sale in Minnesota in 1943," Agr. Exp. Sta., Univ. of Minn., St. Paul, Minn., Bul. 374, Dec. 1943, R. F. Crim, H. K. Hayes, R. O. Bridgford, R. S. Dunham, R. E. Hodgson, F. R. Immer, E. H. Rinke, and Y. S. Tsiang.

"Grow More Cover Crops this Fall," Ext. Serv., Miss. State College, State College, Miss., E. Leaf. 54 (19M), July 1943, J. M. Weeks.

"Corn Tillage Studies on Rolling Putnam Silt Loam," Agr. Exp. Sta., Univ. of Mo., Columbia, Mo., Bul. 475, Aug. 1943, Mack M. Jones and Robert P. Beasley.

"Annual Report of the Board of Control for the Fiscal Year Ending June 30, 1942," Agr. Exp. Sta., Univ. of Nevada, Reno, Nevada.

"Research and Farming 1942," Agr. Exp. Sta., Univ. of N. C., Raleigh, N. C.

"1942 Annual Report," Agr. Ext. Serv., N. C. State College, Raleigh, N. C.

"Weeping Love Grass in Oklahoma," Agron. Dept., Okla. A. & M. College, Stillwater, Okla., Oct. 1943, Hi W. Staten.

"High Crop Yields for War Time," Agr. Ext. Serv., Univ. of Tenn., Knoxville, Tenn., Agron. V. Cir. 7, Jan. 1944, H. E. Hendricks.

"When Should the Hay Crop Be Cut?" Agr. Exp. Sta., Univ. of Vt., Burlington, Vt., Pamphlet 7, June 1943, J. A. Newlander.

"New Rust-Resistant Pole Beans of Superior Quality," Agr. Exp. Sta., Blacksburg, Va., Bul. 350, Feb. 1943, S. A. Wingard.

"Index to Publications of the United States Department of Agriculture 1936-1940," Div. of Publ., Office of Inf., U.S.D.A., Washington, D. C., Mary A. Bradley.

"Report of the Chief of the Forest Service, 1943," U.S.D.A., Washington, D. C., Oct. 15, 1943.

"Report of Cooperative Extension Work in Agriculture and Home Economics, 1943," Ext. Serv. War Food Adm., U.S.D.A., Washington, D. C., Oct. 15, 1943.

"A Key to Pea Varieties," U.S.D.A., Washington, D. C., Cir. 676, May 1943, B. L. Wade.

"Growing Barley for Malt and Feed," U.S.D.A., Washington, D. C., F.B. 1732, Rev. Nov. 1943, H. V. Harlan and G. A. Wiebe.

"Kudzu as a Farm Crop," U.S.D.A., Washington, D. C., F.B. 1923, Oct. 1943, Roland McKee and J. L. Stephens.

"Grow Disease-Resistant Oats," U.S.D.A., Washington, D. C., F.B. 1941, Oct. 1943, T. R. Stanton and F. A. Coffman.

"Lupines, New Legumes for the South," U.S.D.A., Washington, D. C., F.B. 1946, Nov. 1943, Roland McKee and G. E. Ritchey.

"Disease-Resistant and Hardy Oats for the South," U.S.D.A., Washington, D. C., F.B. 1947, Oct. 1943, T. R. Stanton and F. A. Coffman.

"Economic Plants of Interest to the Americas, Roselle (Hibiscus sabdariffa L.) As a Fiber Crop," U.S.D.A., Washington, D. C., Dec. 1943, Julian C. Crane.

"Economic Plants of Interest to the Americas, Kenaf (Hibiscus cannabinus L.) As a Fiber Crop," U.S.D.A., Washington, D. C., Julian C. Crane.

"Earlyana," Agr. Exp. Sta., Purdue Univ., Lafayette, Ind., Cir. 286, July 1943, G. H. Cutler and A. H. Probst.

"Windbreaks for Protecting Muck Soils and Crops," Agr. Exp. Sta., Purdue Univ., Lafayette, Ind., Cir. 287, July 1943, Daniel Den Uyl.

"Agricultural Research in Louisiana, 1941-1942," Agr. Exp. Sta., La. State Univ., Baton Rouge, La.

"Research—A War Effort," 55th A. R. Agr. Exp. Sta., Univ. of Md., College Park, Md., 1941-1942.

"Pasture Renovation," Agr. Ext. Serv., Univ. of Minn., St. Paul, Minn., E. Folder 115, Rev. June 1943, Paul M. Burson and Ralph F. Crim.

"Growing Strawberries in Minnesota, Agr. Ext. Serv., Univ. of Minn., St. Paul, Minn., E. Bul. 72, Rev. June 1943, E. M. Hunt.

"Beef Cattle Production," Agr. Exp. Sta., Miss. State College, State College, Miss., Bul. 377, March 1943, H. O. West.

"Annual Report of the Nebraska State Board of Agriculture 1942," Nebr. State Board of Agr., Lincoln, Nebr.

"Classification of Fruit Bud Development of Peaches and Nectarines and Its Significance in Cultural Practice," Agr. Exp. Sta., Rutgers Univ., New Brunswick, N. J., Bul. 706, July 1943, M. A. Blake.

Soils

The influence of cover crops grown on the soil and turned under as green manure on the leaching of rainfall and nutrients from a soil were investigated by H. H. Hill and reported in Technical Bulletin 83 of the Virginia Agricultural Experiment Station under the title "The Effects of Rye, Lespedeza, and Cowpeas When Used as Cover Crops and Incorporated With the Soil on the Leachings From Dunmore Silt Loam Soil." This was lysimeter work with one tank left uncropped, other tanks with rye and lespedeza turned under, rye and cowpeas turned under, rye and cowpeas grown and cut off, and rye alone as a cover crop but not turned under. The investigation was carried on for a period of eight years. The crops were fertilized with 400 lbs.

of a 4-12-4 fertilizer, and a ton of ground limestone was applied to each of the crop tanks when the experiment began. The soil with no crop at all growing on it permitted nearly 23% of the total rainfall to leach through it. Rye and lespedeza grown and turned under allowed only a little over 16% of the water to leach through, while when rye and cowpeas were grown and turned under, a little over 15% of the total rainfall leached through the soil. When rye and cowpeas were grown and removed from the soil, leaving only the stubble, about 13% of the total rainfall leached through the soil. When rye was grown as a cover crop and removed from the soil, 17% of the total rain leached through. It is obvious that the growing of a cover crop greatly conserved rainfall, but turning under the cover crop as a green manure did not seem to be as effective in reducing leaching through the soil as when the cover crop was cut off and the stubble remained.

Of the nutrients that were washed out of the soil by rain-water, much more calcium was lost from the bare soil than was lost through the cropped soils. The losses were somewhat in the same order as the leaching of the rainfall through the soil. The same was not true of magnesium, in all cases, and there appeared to be more irregularity in the leaching of magnesium from the different lysimeters, in some cases more magnesium being leached from the cropped soils than from the uncropped. In the case of sulphur, the least amount was lost from the uncropped soil, with the most being lost when the cover crop was turned under as green manure. With potassium, the greatest amount was leached from the uncropped soil, although the differences between the cropped and uncropped soils were not as great as in the case of calcium. As the experiment continued, there was a distinct tendency for the amount of potassium leached each year to become less, regardless of cropping. The leaching of nitrate from the soil was much greater from the uncropped than on the cropped tanks, with the smallest amounts leached from the tanks where the rye and cowpeas were grown and then removed. This decrease apparently was not entirely due to the reduction of total nitrogen in the soil by removing the crop, since nearly twice as much nitrate was leached where rye was grown as a cover crop, although this soil at the end of the period had the lowest total nitrogen content of any of the cropped tanks. All of the cropped tanks had more nitrogen in the soil than the uncropped.

"Use of Ground Water for Irrigation in the South Platte Valley of Colorado," Colo. Agr. Exp. Sta., Fort Collins, Colo., Bul. 483, Sept. 1943, W. E. Code.

"Feed the Soil to Feed More People," Agr. Exp. Sta., Purdue Univ., Lafayette, Ind., Leaf. 242, Oct. 1943.

"Nitrogen and Carbon Changes in Soils," Agr. Exp. Sta., Kansas A. & M., Manhattan, Kansas, T. Bul. 56, July 1943, H. E. Myers, A. L. Hallsted, J. B. Kuska, and H. J. Haas.

"Iodine in Soils, Waters, and Farm Products of Kentucky," Agr. Exp. Sta., Univ. of Ky., Lexington, Ky., Bul. 447, June 1943, J. S. McHargue.

"Report of the Chief of the Soil Conservation Service, 1943," U.S.D.A., Washington, D. C., Oct. 10, 1943.

Economics

¶ A survey of agricultural practices in northern Florida as typified in Madison, and to a lesser extent in Jackson County, furnished information on time, amount of labor required, and the usual fertilizer practices followed for growing the common crops in this area. This survey was made by M. E. Brunk and J. W. Reitz and published as Bulletin 388 of the Florida Agricultural Experiment Station, entitled, "Labor and Material Requirements for Crops and Livestock, I. A General Farming Area in Florida." The data show that most of the farmers did not fertilize their corn, since the crop usually followed a well-fertilized crop. Some farmers reported good increases in yields from planting winter cover crops on land to be planted to corn. Short staple cotton was usually fertilized, the common analyses being 3-8-5, 4-8-4, 4-8-6, and 5-7-5. Peanuts

harvested for nuts usually received mixtures such as 3-8-5, 0-12-4, and 2-9-4. Sugar cane growing in this section is largely a home-consumption crop with an average of only 2.3 acres per farm. Fertilization varied from nothing up to 1,000 lbs. per acre with the most prominent analyses being 4-8-6, 3-8-5, and 4-8-4. Sweet potatoes usually received at least 200 lbs. per acre of fertilizer, the most common mixture being 3-8-5. Flue-cured tobacco was the most uniformly fertilized crop covered by the survey, the usual application being 1,000 lbs. per acre of 3-8-5 or 3-8-8. Watermelons usually were fertilized with 4-8-6. A table has been drawn up based on the survey showing the distribution of labor and mule requirements for each of the crops during the year. Labor and feed requirements for livestock also were covered. The latter part of the Bulletin is devoted to suggestions for planning the farm business based on information obtained in the survey.

"Rhode Island Hay Supplies," Agr. Exp. Sta., R. I. State College, Kingston, R. I., Bul. 290, June 1943, Albert L. Owens.

"Maximum Wartime Production Capacity of Rhode Island Agriculture," Agr. Exp. Sta., R. I. State College, Kingston, R. I., Miscl. Publ. 17, July 1943, J. L. Tennant and R. G. Wheeler.

"Forest Plantations of Wisconsin," Wis. Dept. of Agr., Madison, Wis., Bul. 232, Oct. 1942.

"Wisconsin 1840-1940 Forests and Land Use," Wis. Dept. of Agr., Madison, Wis., Bul. 229, April 1942.

"Wild-Hay-Management Practices in Modoc County," Agr. Exp. Sta., Univ. of Calif., Berkeley, Calif., Bul. 679, July 1943, L. W. Fluharty and J. C. Hays.

"Labor and Material Requirements of California Vegetables," Agr. Exp. Sta., Univ. of Calif., Berkeley 4, Calif., John H. MacGillivray, Arthur Shultis, A. E. Michelbacher, P. A. Minges, and L. D. Doneen.

"Food Values on a Pound, Acre, and Man-Hour Basis for California Fresh Vegetables," Agr. Exp. Sta., Berkeley 4, Calif., John H. MacGillivray, Arthur Shultis, G. C. Hanna, and Agnes Fay Morgan.

"Food Values on a Pound, Acre, and Man-Hour Basis for California Processed Vegetables," Agr. Exp. Sta., Berkeley 4, Calif., July 1943, John H. MacGillivray, Agnes Fay Morgan, G. C. Hanna, and Arthur Shultis.

"Connecticut Vegetable Acreages 1941-1942-1943," Dept. of Agr., State Office Bldg., Hartford, Conn., Bul. 83, Dec. 1943.

"Organizing and Operating Bulloch County Farms to Meet War Needs," Ga. Exp. Sta., Experiment, Ga., Bul. 227, Oct. 1943, W. E. Hendrix, W. T. Fullilove, and C. R. Sayre.

"Peanut Production Possibilities in Georgia," Ga. Exp. Sta., Experiment, Ga., Bul. 228, Oct. 1943, W. E. Hendrix, Charles P. Butler, and Kenneth V. Goodman.

"Food Production for War, Costs and Returns of Irrigated Pastures," Ext. Serv., Univ. of Idaho, Moscow, Idaho, War Cir. No. 9, 1943, Paul A. Eke.

"Food Production for War, Prospects in Growing Vegetable Seeds in Southern Idaho in 1943," Ext. Serv., Univ. of Idaho, Moscow, Idaho, War Cir. No. 17, 1943, A. N. Nybroten.

"Farm Outlook for Indiana 1944," Agr. Ext. Serv., Purdue Univ., Lafayette, Ind., Leaf. 253, Dec. 1943.

"Maine Farm Families and the War, 1941-43," Ext. Serv., Univ. of Me., Orono, Me., Me. Ext. Bul. 320, Jan. 1944, Bruce B. Miner.

"Returns from Dairy Farming in Massachusetts in 1942," Agr. Exp. Sta., Mass. State College, Amherst, Mass., FM 15, Oct. 1943, Charles R. Creek.

"Results of Pasture Improvement," Agr. Exp. Sta., Amherst, Mass., FM-10, June 1942, Charles R. Creek.

"Returns From Pasture Treatment," Agr. Exp. Sta., Amherst, Mass., FM-13, April 1943, Charles R. Creek.

"Feed Shortage," Agr. Ext. Serv., Univ. of Minn., St. Paul, Minn., Pamph. 127, Oct. 1943.

"The Minnesota Farm Outlook for 1944," Agr. Ext. Serv., Univ. of Minn., St. Paul, Minn., E. Pamph. 130, Dec. 1943, W. H. Dankers.

"Farm and Home Improvement Contest," Ext. Serv., State College Station, Raleigh, N. C., E. Cir. 267, Sept. 1943, J. C. Hubbard and Estelle T. Nixon.

"Farmers' Response to Production Goals in Four Selected Areas of South Carolina," Agr. Exp. Sta., Clemson College, Clemson, S. C., Bul. 347, Oct. 1943, Allen D. Edwards and J. H. Stevenson.

"An Economic Study of Dairy Farming in the Roanoke Area in 1939-1940," Va. Agr. Exp. Sta., Blacksburg, Va., T. Bul. 88, July 1943, F. L. Underwood.

"Food for Victory," Agr. Ext. Div., Blacksburg, Va., Bul. 157, Dec. 1943, John R. Hutcheson.

"Suggestions for Meeting 1944 Crop Goals," Ext. Serv., Va. A. & M., Blacksburg, Va., MA-3, Jan. 3, 1944, W. H. Byrene.

"Labor Requirements for Selected Farm Enterprises in Washington," Agr. Exp. Sta., Pullman, Wash., Bul. 432, July 1943, Carl F. Reuss, Arthur W. Peterson, and Mark T. Buchanan.

"An Economic Study of Farming in Northern Spokane County, Washington," Agr. Exp. Sta., Pullman, Wash., Bul. 433, July 1943, Woodrow W. Rufener, Ben H. Pubols, and Stanley W. Schwartze.

"An Economic Study of Farming in Selected Communities of Thurston County, Washington," Agr. Exp. Sta., Pullman, Wash., Bul. 434, July 1943, Woodrow W. Rufener, Ben H. Pubols, and Stanley W. Schwartze.

"Dairying as an Economic Enterprise in West Virginia," Agr. Exp. Sta., Morgantown, W. Va., Bul. 311, Sept. 1943, L. F. Miller.

"Wisconsin Agriculture, Climate and Land Use," Wis. Dept. of Agr., Madison, Wis., Bul. 238, April 1943.

"Report of the Chief of the Agricultural Adjustment Agency 1943," War Food Adm., U.S.D.A., Washington, D. C.

"Report of the President of the Commodity Credit Corporation, 1943," War Food Adm., Commodity Credit Corp., U.S.D.A., Washington, D. C., Oct. 14, 1943.

"Farm Adjustments and Income on Typical Corn Belt Farms," U.S.D.A., Washington, D. C., Cir. 688, Nov. 1943, Wylie D. Goodsell.

"The Farm Real Estate Situation 1942-43," U.S.D.A., Washington, D. C., Cir. 690, Oct. 1943, M. M. Regan, Fred A. Clarenbach, and A. R. Johnson.

"Market News Service on Fruits and Vegetables," War Food Adm., and Fla. State Marketing Bureau, Lakeland, Fla., Oct. 12, 1943, H. F. Willson.

Efficient Fertilizers for Potato Farms

(*From page 26*)

broadcast before plowing, yields were significantly increased on plots 1, 2, and 3 despite the injury and depressed yields resulting from band application as shown in column 4.

Results at Torresdale in 1942 with the same analyses and rate of application with total fertilizer application in bands are shown in the Table III.

TABLE III.—1942 POTATO FERTILIZER EXPERIMENT, PHILADELPHIA COUNTY PRISON FARM, TORRESDALE, PENNSYLVANIA

Plot	Fertilizer analyses	Rate applied	Yield—bushels per acre standard method
1	4–8–8.....	1,000	453.7
2	4–12–12.....	1,000	595.8
3	4–16–16.....	1,000	497.4

Although the yields were not depressed by the band method of application as at Doylestown, this is believed to be due to the fact that the field had turned under a crop of soybeans to which 10 tons of manure had been applied before plowing. Undoubtedly, the higher nitrogen status and better organic content enhanced the values of the high phosphorus, high potash analyses.

On a timothy sod field adjacent to the above, a 4-12-12 fertilizer at the rate of 1,000 pounds per acre was applied as follows: (a) all in band, (b) three-fourths plowed down and one-fourth in band. An average of four replications showed a yield of 321.16 bushels for the band method and 374.19 bushels where three-fourths was plowed down. To determine whether additional phosphorus and potash would increase the yields, one half of each of the above plots had 500 pounds of an 0-12-12 broadcast before plowing. On the area where basic treatment was in bands no increase was recorded, in fact there was a decrease of 1.36 bushels. On the plowed-down plot, however, the extra application of 0-12-12 all plowed down gave an additional increase of 18.04 bushels, or a total increase over the all-band method of 71.07 bushels.

Further tests comparing the all-band method with plowing under of different proportions of the total fertilizer application were carried on in Pennsylvania during 1943. These tests are summarized in Table IV.

Fields A and B were located on the farm of Ed Fisher at Coudersport, Pennsylvania; Field C was at Camp Potato;

TABLE IV.—RESULTS 1943 POTATO FERTILIZER TESTS

Farm	Analyses	Amount lbs.	Method	Yield bu. per acre	Increase bu. per acre
A	6–18–18	1600	Band	196.58	
	"	1000	Band		
	"	600	Plowed Under	291.53	94.95
B	6–18–18	900	Band	234.56	
	"	300	Band		
	"	600	Plowed Under	305.45	70.89
C	4–12–12	1600	Band	283.70	
	"	800	Band		
	"	800	Plowed Under	352.60	68.90
D	4–12–12	1000	Band	121.63	
	"	500	Band		
	"	500	Plowed Under	153.00	31.37
E	4–12–12	1200	Band	209.10	
	"	300	Band		
	"	900	Plowed Under	250.10	41.00

and Fields D and E were on the Philadelphia County Prison Farm at Torresdale, Pennsylvania. Yields on all of the above farms were below average because of the late spring for the Potter County farmers and extreme drought on the farms in the southeastern part of the State.

From the results of the potato-fertilization studies summarized in this discussion, it would appear that aside from the recognized value of good seed, good spraying, and proper cultivation, the most important consideration is a fertilizer with the right ratio of nitrogen, phosphorus, and potash, provided this is applied in such a manner as to insure its most efficient utilization by the sensitive potato plants. At no time in the history of the potato industry has there been such a crying need for such efficiency.

The Use of Borax in the Legume-Livestock Program of the South

(*From page* 20)

Tennessee Valley, it appears that a sounder and more practical livestock program will be developed. He states, in part: "We have observed with considerable interest the results obtained from demonstrations involving the use of borax on alfalfa and certain other legumes. This practice has, without a doubt, proved to be practical on the soil types common in this county in our legume and livestock program, and there is every indication that such a practice will be common and widespread in the years ahead.

The effect of borax on crimson clover is noted particularly on drouthy land. Note the dense stand at left and also the size of blossoms which indicates greater seed production.

"Outstanding results have been noted in the case of alfalfa. The yield of hay has been substantially increased and the general appearance of the stand is greatly improved. This condition reflects itself particularly in lengthening the profitable life of the stand of alfalfa and certainly most farmers will agree that this factor alone is important after taking into consideration the economical production of forage together with the conservation of the soil. Recent hard rains have proved that the land should certainly be kept covered wherever practical."

T. W. Hillsman, County Agent in Madison county, reported the beneficial effect of borax when applied on crimson clover. He said that on the gray land of that county, "Crimson clover often 'fires' and finally the plants die. This did not occur when borax was used."

T. L. Mayes in Franklin county, the largest crimson clover seed-producing county in the United States, reported that borax increased the yield of seed, increased the viability, and ripened the crop about three days earlier.

G. L. Cleland, Agent in one of the Middle Tennessee bluegrass counties wrote, "It is my experience that borax increases the yield of alfalfa in this county an average of 20%, and in addition, will maintain a stand a year or two longer, which will add another valuable increase. As a result of our demonstration, there is an increased acreage of alfalfa in this county."

Stanley Ezell, Agent in Roane county, stated that, The use of borax on legumes has proved itself to be a practice that must not be omitted in the Roane County legume-livestock program. Our demonstrations show higher yields in practically every case, ranging from 20% to 80%."

J. Ben Thompson, Agent in Cheatham county, said, "I think there is a great possibility in the use of borax on alfalfa and red clover in this county. The results seem to be much greater on thinner soils." This last statement is very significant, for ability to grow alfalfa successfully on thin soils is necessary.

Another very interesting report was received from the County Agent in Wayne county, who wrote that, "Two alfalfa demonstrators using borax claimed that the hay from the land treated with borax was eaten better by

the livestock to which it was fed." This sounds reasonable. The alfalfa was probably more palatable and nutritious due to the fact that the leaves were greener and were retained better during the curing process, resulting in leafier, greener hay.

These quotations from County Agents' reports give a general picture of what the Agents are thinking. During the past four years they have observed a total of over 900 demonstrations where borax has been used on alfalfa, red clover, and crimson clover. Their combined information and conclusions on any subject tested to this extent should be significant.

A number of livestock producers in Tennessee appear to be pointing the way toward more efficient livestock production, using alfalfa, not only as a source of hay, but for pasturing during emergencies when other types of pasture are not available. They have found that alfalfa properly treated, which, of course, includes the use of borax, can be grazed by all types of livestock, if judgment is used with respect to the severity of grazing. One of these farmers, Robert Bell, operates what might now be termed a dairy farm in Dyer county, which is a cotton and livestock county in West Tennessee. He seeded a 12-acre field of alfalfa in the fall of 1940 after he had limed it at the rate of three tons per acre. In the spring of 1942, he applied 100 pounds of triple superphosphate, 200 pounds muriate of potash, and 20 pounds of borax per acre. He cut this alfalfa three times in 1942 with a yield of 1,000 bales from the 12 acres, and then pastured it from the time his Korean lespedeza gave out in September until after frost, when crimson clover pasturage became available. An interesting observation was that, with the use of potash and borax as well as limestone and phosphate, he could grow alfalfa at least as successfully on his light buckshot type soil (Grenada) as he could on his well-drained brown soil (Memphis) and that these materials had increased enormously the acreage of his land adapted to alfalfa.

Another dairy farmer, Henry Clark, in East Tennessee, turns dairy cows on his alfalfa in early October and grazes off what would normally be his last cutting. This is grazed until mid-November when he turns his cows on crimson clover and small grain. This

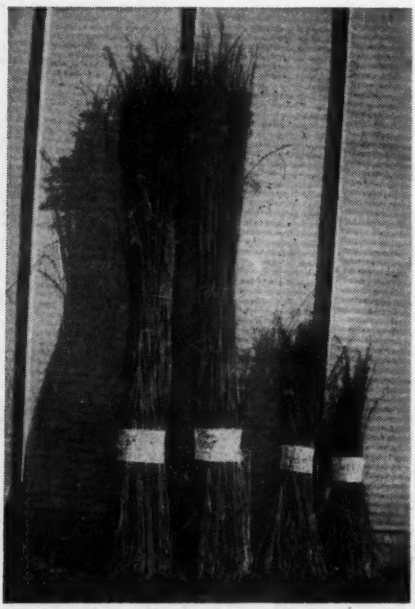
A group of agronomists and fertilizer manufacturers study the effects of potash and borax on alfalfa in Williamson county, the heart of the Tennessee bluegrass area.

provides pasture until May of the following year, when he turns his animals on bluegrass and white clover, followed by grazing lespedeza in mid-summer. Mr. Clark operates only 42 acres of tillable land and he has increased his annual income from $120 in 1932 to over $4,000 last year. His principal income is from the 10-cow herd which he is milking.

From experience, it is concluded that borax takes its place as a plant nutrient along with limestone, phosphate, and potash in developing a legume-livestock program in Tennessee. The extent to which it should be used on crops other than those mentioned remains for further research and test demonstrations on farms.

Plow-Sole Fertilizers Increase the Profits

(*From page* 12)



Bundles of hemp harvested from the Rauls plots —yield as follows:
Plow sole, 10-10-10 at 600 lbs. per acre plus 200 lbs. 3-12-12 drilled with seed = 8,174 lbs.
Plow sole, 10-10-10 at 600 lbs. per acre only = 6,830 lbs.
3-12-12 (200 lbs. drilled with seed) = 3,025 lbs.
No fertilizer = 1,344 lbs.

be available to growing crops must be in water-soluble form, and certainly we know that during periods of drouth this water-soluble plant food must be derived and brought up from the lower root-feeding zone. I am confident this method of applying fertilizer will prove practical and may be followed in general in connection with a number of crops. The crops which make their growth over a long period of time and have a high-acre value, the crops which develop an extensive and deep-feeding root system, the crops which are known to require large amounts of plant-food nutrients—these are the crops which may lend themselves best to this method of fertilizer application.

It is reasonable to expect that rather heavy applications of phosphate and potash placed on the plow sole at a depth of from 5 to 7 inches for legume crops, particularly alfalfa and clover, may prove superior to the surface or shallow placement now followed. And right here I wish to present the results of a demonstration set up on a field seeded to clover this past spring. The fertilizer, 0-20-10, was applied with an attachment on the plow in the fall of 1942 at 450 lbs. per acre. At the time of seeding in the spring of 1943, a light application, 100 lbs. of 0-20-10 per acre, was drilled in with the barley nurse crop. We were chiefly interested in the effect this heavy plow-sole application of fertilizer would have on the clover crop in 1944. However, to our surprise, the response of the barley to this plow-sole application was very striking. The results are shown in the next column.

This field was seeded to medium red clover. Just before freeze-up last fall

Soil	Treatment	How applied	Yield of barley
	450 lbs.		Bu.
Carrington silt loam	0–20–10 + 100 lbs. 0–20–10	Plow sole Drilled with seed	54.8
"	100 lbs. 0–20–10	Drilled with seed	45.2
"	No fertilizer	.....	31.0

an inspection of the plot showed that the clover had made a very rank growth on the plot receiving the plow-sole treatment. There was a noticeable difference between the check plot and the plot receiving the 100-lb. application only. However, the yields of hay on these plots in 1944 will tell the final story.

Another plow-sole demonstration was set up on a field seeded to hemp in 1943. The response to treatment with 10-10-10 at 600 lbs. per acre on the plow sole was spectacular. The field selected had grown good crops of corn in 1942 and 1941. Manure was applied for both corn crops. No manure, however, was used on the hemp crop in 1943. The acre strip where the plow-sole treatment of 10-10-10 was applied was split into two sections—one-half received an additional treatment with 3-12-12 at 200 lbs. per acre, applied in contact with the seed with a fertilizer drill. Another plot received the 3-12-12 at 200 lbs. per acre only, drilled with the seed.

The 3-12-12 starter fertilizer resulted in a quick response in the early period of growth, but this plot was soon outstripped by the plow-sole fertilized plots. In fact, within three weeks' time the hemp roots had started feeding on the plow-sole fertilizer, and the rate of growth was phenomenal from that time on. The hemp on the plow-sole plots attained a height of 8 feet, was dark green in color, and very uniform. The unfertilized strip turned yellow in the early stages of growth. It became infested with weeds, and at harvest averaged only 3 feet in height. The results of this demonstration are reported in Table II.

The results of this demonstration indicate that the 200 lbs. per acre of 3-12-12, while profitable, did not supply sufficient plant food, nitrogen in particular, to make a satisfactory crop. Both of the plow-sole treated plots, 10-10-10 at 600 lbs. per acre, with and without starter fertilizer, did make a good crop. It is probable that a mixture such as the 10-6-4 would have given just as good results as the 10-10-10.

I am confident we can produce good crops of hemp on high land mineral soils of medium to even low fertility by plowing under, discing in, or applying with an attachment on the plow sole from 600 to 800 lbs. of high-nitrogen

TABLE II.—FERTILIZER DEMONSTRATION ON HEMP

Name & address of cooperator and Soil type	Treatment	How applied	Rate per Acre	Yields in pounds*	Grade	Value of increase	Cost of fertilizer	Net profit per Acre
Louis Rauls De Forest	10–10–10 + 3–12–12	Plow sole drilled	600 200	8,174	1	$170.75	$18.83	$151.92
	10–10–10	Plow sole	600	6,830	1	137.15	15.00	122.15
Carrington silt loam	3–12–12	drilled	200	3,025	4	25.20	3.83	21.37
	No fertilizer			1,344	4			

* Calculated on 10 per cent moisture basis.

fertilizers such as 10-6-4 or 8-8-8, per acre, provided the soil type is suitable and rainfall adequate.

The demand for these plow-sole attachments may exceed the supply this coming year. In case attachments cannot be secured, we are suggesting to hemp and hybrid seed corn growers that they will find it profitable to disc in or plow under such mixtures as 8-8-8 or 10-6-4. Results may not be as outstanding or as satisfactory as where the fertilizer is applied in bands on the plow sole, but nevertheless may be highly profitable.

Coalgate, Okla., Farm No "Lucky Streak"

(*From page* 23)

farm is the soil, and its fine condition. In the 20-odd years that Pasquali has been practicing soil building with help from three different county agents, he has restored organic matter and given to the soils the needed minerals. By building up the organic matter he has made the soil sponge-like so it will hold more moisture and his crops will not suffer in time of drought. It is no wonder that he was able to grow grain sorghums too tall to cut with a binder in a dry year like 1943. No one else in the community has such a production record; other farmers saw their crops burn and shrivel to less than 50 per cent normal yields. Not only did August Pasquali produce enough tons of feed to fill two silos, but he also produced a more complete feed. Cattle on the Pasquali farm do not chew old bones, the tell-tale sign of mineral starvation, as they do on many eastern Oklahoma upland farms. Pasquali's cattle receive their minerals in home-grown feed, the plants having taken them from the soil. The owner gives much credit to Curtis Floyd, present county agent, for his help in the feeding and handling of his livestock. He is grateful for help from the U. S. Department of Agriculture, for without it, he thinks he may not have succeeded.

On the other hand, the Department of Agriculture has profited from the experience of successful farmers like August Pasquali. It used to be thought that terraces alone would control soil erosion. Now it's known that only a complete and coordinated conservation program, using many practices to treat the land according to its needs and adaptabilities, can stop soil losses. It's known that soil, once erosion is controlled, must have its fertility maintained with a good soil management program that includes fertilizers, barnyard manure, and legume crops. Pasquali proved that alfalfa could be grown on upland soils of eastern Oklahoma when these practices were applied, and that yields of all crops could be increased.

All the soil and water conservation knowledge that has been gathered through the years by the August Pasqualis, by the county agents, by the research stations, and by all other employees of the Department of Agriculture is now available to other farmers in nearly 1,000 farmer-organized soil conservation districts that embrace nearly 550,000,000 acres. August Pasquali's farm is within a soil conservation district—the Blue and Boggy District that covers parts of three counties draining into the Blue and Boggy Rivers. Technicians of the Soil Conservation Service—the action agency of the Department of Agriculture responsible for giving technical assistance to farmers in planning and applying complete soil conservation systems—are helping other farmers to conserve and improve their land resources, to keep them forever productive.

Some people have said that everything August Pasquali touches turns into profit, or that he has had "a lucky streak." But his farm demonstrates he has learned to live and abide by an unwritten law, "Whoever works with the Laws of Nature is successful; whoever violates her laws fails."

Where Do We Stand With Fertilizers?

(*From page* 16)

be somewhat higher relatively than they should be since in all cases, but two, the nitrogen response was segregated by difference of the PK and NPK combinations, whereas with the values for P and K, these are about equally divided between responses used singly and by segregation. Hay values were calculated at $20.00 per ton. The same yardstick may be applied to pastures. Using the data in Table V, we have constructed Table XI, which shows pretty definitely where we stand with these nutrients applied to good pasture sods.

The column headed Units per Annum may be a little misleading, in that in most instances phosphoric acid and potash were applied every third year, and the amounts listed are those that can be allocated to each year. Protein has been used as a basis for determining the value of the increase since all top-dressed plots were higher in this substance than in untreated areas. The value assumed, 15 cents per pound, is obviously too high if considered alone, but not as high as its cost in an 18 per cent dairy feed at present prices, and wherever found it is associated with other digestible nutrients.

Figures for response in hay fields will vary somewhat from those reported in Table XI, but will follow the same general pattern.

Needless to say, this article is presented to emphasize the importance of adequate fertilizers for New England agriculture. It was very fortunate indeed that there were fairly large reserve supplies of wheat and other grains stored up before war came. These reserves are now nearing exhaustion, which means that so far as New England is concerned we will be more and more dependent upon the feed we produce locally. This places additional emphasis upon fertilizers upon which we are so dependent for full crop yields.

Because we are so dependent upon them for potatoes, vegetables, and forage crops, in fact everything, practically, that we are able to produce as a contribution to the national nutrition program, it would be ideal if we had stockpiles of these important fertilizer substances built up here to draw upon in the emergency. They are just as important as wheat, rubber, or tin to this corner of the United States which contains no potash mines, no superphosphate deposits, nor nitrogen plants. In the future, this is a factor which might well be considered in any scheme for national planning.

TABLE XI.—RETURNS FROM DIFFERENT NUTRIENTS ON PASTURE

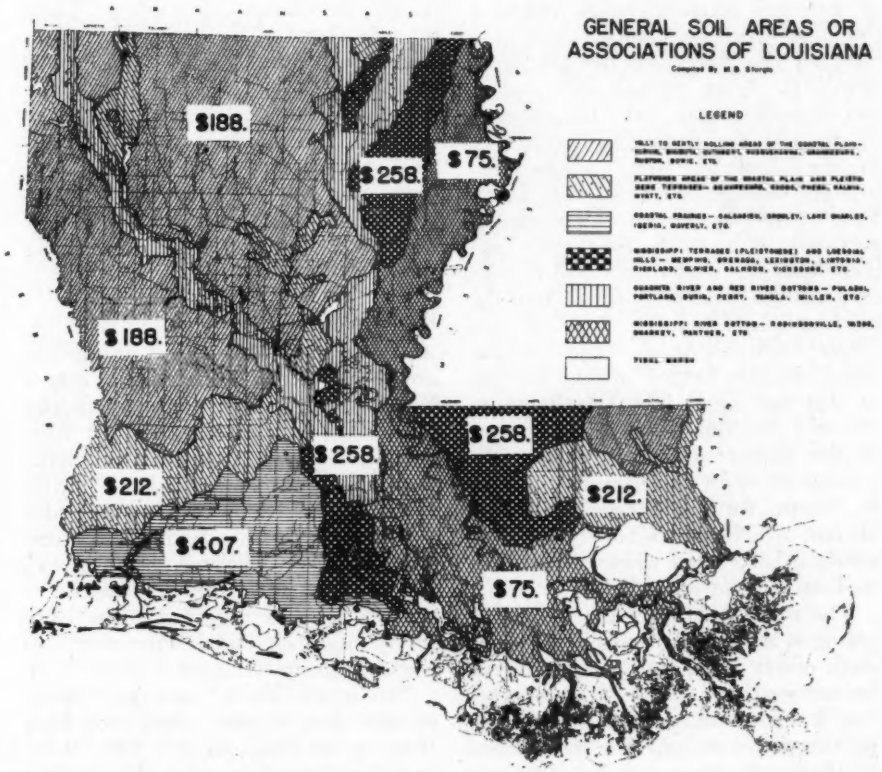
Element	Units per Annum	Gain per Unit Pounds Protein	Value of gain	Cost of fertilizer per Unit	Gain over Cost
			Dollars	*Dollars*	*Dollars*
N	2.5	60.4	9.06	2.50	6.56
P	1.67	32.4	4.86	1.40	3.46
K	1.67	36.8	5.52	.90	4.62

THE AVAILABLE POTASSIUM CONTENT AND POTASH REQUIREMENTS FOR THE GENERAL SOIL AREAS OF LOUISIANA

General Soil Areas	Tests showing no deficiency		Tests showing deficiency		Avail. K needed for normal production p. p. m.	Estimate of no. acres in cultivation 1,000 acres	K_2O recommended lbs. per acre	Net profit per ton of 60% muriate of potash for different crops dollars		K_2O needed in each area tons
	Per cent of tests	Avail. K p. p. m.	Per cent of tests	Avail. K p. p. m.						
Hilly to gently rolling areas of the Coastal Plain	27	108	73	65	80	1,850	32–40	cotton— potatoes— sweet potatoes— tomatoes—	188.65 440.00 1,107.50 534.50	24,300
Flatwoods areas of the Coastal Plain and Pleistocene Terraces	20	102	80	62	80	210	32–48	cotton— potatoes— beans—	212.73 313.50 452.50	3,360
Coastal Prairies	35	130	65	57	100	1,320	16–48	cotton— rice—	407.70 178.00	13,700
Mississippi Terraces and Loessial Hills	38	127	62	66	100	1,350	32–40	cotton— sugar cane— sweet potatoes—	258.28 183.51 777.50	15,060
Ouachita River and Red River Bottoms	46	146	54	65	100	550	32–48	cotton—	258.44	5,940
Mississippi River Bottoms	56	242	44	113	150	600	24–36	cotton— potatoes— sugar cane—	75.00 507.50 114.66	3,960

Potassium Content and Potash Requirement of Louisiana Soils

(*From page 6*)



The amount of money superimposed upon the various soil areas in the map represents the net profit from each ton of 60% muriate of potash used in growing cotton in that area. (See Table opposite).

that responds generally to additions of potash in this area. It will require more experimental work to definitely establish the amount of potash needed in the Mississippi bottom, particularly for cotton and sugar cane.

The data given are based on the fertilization of cash crops and show that the annual requirement of potash necessary for the establishment of well-balanced fertilizer practices in Louisiana is in excess of 60,000 tons of K_2O. When it is considered, however, that the feed, pasture, and green-manuring crop in the rotations require less fertilizer than the cash crops, the minimum potash requirement is in excess of 45,000 tons K_2O.

Mary had a little lamb,
His hair was white as heck,
And everywhere that Mary went
The poor sap signed the check.

I'm glad I am an American
I'm glad that I am free,
I wish I were a little pup,
And Hitler were a tree!

With Neck Stuck Out!

(*From page* 5)

tinct group and lived and achieved their goals and had their own ideals of national conduct vastly different from the urban population. The War Between the States was not any more North vs. South than it was a conflict of metropolitan and rural communities; and the financial struggles of the era following it were mostly fights between Granger West and Wall Street East. Some of the same foolishment persisted to a much later time and crept into the settlements which were only villages, as distinguished from the cultivated land beyond. It's true that school administration and educational changes helped to cut the core of that bad apple, but I really think this war has finally swept away most of the clutter and fog dividing the citizens of town and country. That is, except for some false leadership clamor, which infests both urban and rural life alike; and when peace comes we'll tackle that one, too.

The rude isolation of the farmstead, going it alone and resisting encroachment of any kind, has come to an end. In my youth no farm felt secure unless it had a mean and vicious dog on the premises, and the sign-manual of the genus homo on the farm was a many pronged pitchfork, useful for marauders as well as manure. No wonder city folks shrank from country contacts and ruralites never got to know anybody in town "worth knowing."

IF I give another idea I have about certain farm thought adjustments which are taking place, you won't agree with me perhaps. But I'll venture it anyhow. Here it is:

To rural-raised people "love of country" meant almost exclusively the open country, the raw outdoors, the place of universal germination, growing, flowering, and fruiting. Generations of soil-born folks felt that their environment had the finest spiritual refreshment and the noblest expression of all the natural freedoms. They thought that the best source of patriotic fervor came from wide landscapes, fresh air, and nearness to the elements. At least I know I did, away back in those barefoot days with fish pole and dog on rural rambles. We grew into it and it stuck by us. The hymn of the farmer was America the Beautiful, with stress on "spacious skies and amber waves of grain."

ALL right so far; but go with me and a visiting farm delegation down into the tenement district near a big city stockyards or perishable freight terminal. As the bus rumbles over bumpy, slippery cobblestones and folks wipe grimy factory soot off their faces, as the street narrows and dips under dark and foreboding viaducts, or turns crazy corners bordered by ash-heap playgrounds and dirty bill-boards, I see the farmers begin to count little service stars on faded dime-store emblems in dusty windows.

"Six in one block," says one. "Seven in this one, if you count two back there at the shine stand." Or, "Why, here's a house about as big as our chicken coop with three stars showing," calls another.

"What have they got down here worth fighting for?" said one of the farmers afterwards as we sat in the hotel lobby. "What can patriotism and love of the land mean to families who see so durn little of God's real country?" he concluded.

And yet, he mused, more boys per square mile and per thousand of the population have been drafted or have volunteered from the underprivileged, shut-in areas of crowded living than from the verdant rural headwaters of our country's inspiration.

But the idea of this gamble with death over such very low stakes at best,

when contrasted with the sacrifices of the country boy who lived closer to the things which seem to make life desirable and replete—this brought up a tangled skein of thought, something rather disturbing to the ingrained, back-country producer.

When you knuckle down and ask yourself if it's to be a question about which boy sacrificed the most or lost the best things by entering the service, the puzzle isn't over yet. Maybe the kid who lived back of the yards in a junky alley got sort of attached to something there, something not so inspiring perhaps as the visions that were constantly before the boy from out beyond; but pretty gripping anyhow.

AFTER debating this question awhile, our tolerant rural workers will come to the foregone conclusion that probably we'd better forget what things were sacrificed for a minute and measure it on another basis. Perhaps it fits closer if we analyze it on the basis of taking up service for the country as a whole, seeing how much each can contribute to hold fast to the best and then make the best better—for everybody.

"Looking at it that way I come to believe that the lad down there in the slums and slack places deserves a mighty big hunk of praise and appreciation for soldiering and sailoring so well, with so little inspirational background," remarks the farm visitor.

This sort of inward thinking and turning of things wrong side out a little from the old ways of wearing your mental outlook, it sort of fetches you smack dab up against one of the most helpful aspects of national life. It does a lot to weave into one fabric the threads of American ideals, giving rural folks a better insight into the finished product than the kind of demonstrations we used to get from peacetime rabble-rousers.

In return for his share of what little he sacrificed in the tenements, the city boy will receive better physical training, better manual education, better discipline, and probably somewhat better nutrition.

In payment for part of his lost opportunities afield, the rural boy will be broadened and matured into a wiser and a more tolerant and progressive thinker. This adjustment may be just about as vital for a real union of goodwill forces when peace returns as the improvement of the slum boy.

It's too bad we had to go to all this bother, expense, and sorrow to help our society into better alignment and give town and country the same goal. But maybe it will be worth all of the debt and worry, to see things more alike without so many fictitious barriers and stubborn prejudices.

Whisper this loud, brother: The real test of the final effects will depend more or less upon the arrangements we stay-at-home patriots make to get all these lads meshed into the gears of life again. Many of them are being discharged now and more will be back in a few months. It's a challenge.

Therefore, in terms of universal national service, let's think more about how to fit town and country veterans into the big domestic job ahead of us—and less about what law Congress may enact touching on universal service in wartime.

Farm folks don't need to fret about the latter. But it's a rural job to put a shoulder to the wheel and keep it turning at home in normal living, not thinking of what the boys sacrificed so much as planning to have them get a chance to continue their team-work begun so well abroad.

We can truly make America the Beautiful, and it need not end where the country lane meets the city street. There need be no more having our inspiration for patriotism and love of country measured in terms of local environment.

How far out is my neck, do you think?

LANGUAGE DIFFICULTY

A Frenchman, struggling with the English language, turned to an American friend for counsel:

"What," he asked, "is a polar bear?"

"Polar bear? Why he lives 'way up north."

"But what do he do?"

"Oh, he sits on a cake of ice and eats fish."

"Zat settle! I will not accept!"

"What in the world do you mean, you won't accept?"

"Ah," explained the other, "I was invited to be a polar bear at a funeral, and I will not accept."

"Please don't cry, honey," pleaded Boatswain Botsford, as he awkwardly patted his girl's shoulder. "Honest, I ain't got a girl in every port. I ain't *been* in every port."

"Would you scream if I kissed you?"

"How could I if you did it properly?"

A young man about town approaching a cigar counter behind which stood a cute young thing, said: "Do you keep stationery?" Said cute young thing: "Yes up to a certain point, then I just go all to pieces!"

HAPPY LITTLE FLEA

Here comes the happy, bounding flea;
You cannot tell the he from she;
The sexes look alike you see—
But she can tell and so can he.

"What's the cat's name?"

"Ben Hur."

"How'd you happen to choose that?"

"Well, we called him Ben till he had kittens."

HE LOOKED IT

The colored soldier had been peeling potatoes until his hands ached. Turning to a fellow K. P. he said: "What d'you suppose dat sergeant mean when he call us K. P.?"

"Ah dunno," replied his co-worker. "But from de look on his face, Ah thinks he meant 'Keep Peelin.' "

"It's nice to kiss in a shady parking place, but my boy friend doesn't stop there."

"You mean—"

"Yes, he keeps right on driving."

Johnny was not at the dinner table when his father came home, for the reason his mother had sent him upstairs to bed for swearing.

"Swearing!" bellowed the father. "I'll teach him to swear!" He dashed up the stairs and midway, stubbed his toe, stumbled and crashed his chin on the step.

When the atmosphere cleared a little, Johnny's mother said sweetly, "No more now, dear. You've given him enough for one lesson."

Mother: "I don't believe I approve of these one-piece bathing suits."

Daughter: "Oh, I think a person should wear something."

Need for—

BORON IN AGRICULTURE

Authorities have recognized that the depletion of Boron in soil has been reflected in limited production and poor quality of numerous field and fruit crops.

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Circulars

Tomatoes (General)
Asparagus (General)
Vine Crops (General)
Sweet Potatoes (General)
Fertilize Potatoes for Quality and Profits (Pacific Coast)
Fertilizing Small Fruits (Pacific Coast)
Better Corn (Midwest) and (Northeast)
Fertilize Pastures for Better Livestock (Pacific Coast)
Of Course I'm Interested (Pastures, Canada)
Meet the Family (Canada)

Reprints

T-8 A Balanced Fertilizer for Bright Tobacco
N-9 Problems of Feeding Cigarleaf Tobacco
T-9 Fertilizing Potatoes in New England
KK-9 Florida Studies Celery Plant-food Needs
MM-9 Fertilizing Tomatoes in Virginia
UU-9 Oregon Beets and Celery Need Boron
F-3-40 When Fertilizing, Consider Plant-food Content of Crops
J-4-40 Potash Helps Cotton Resist Wilt, Rust, and Drought
S-5-40 What Is the Matter with Your Soil?
A-1-41 Better Pastures in North Alabama
E-2-41 Use Boron and Potash for Better Alfalfa
K-4-41 The Nutrition of Muck Crops
Z-9-41 Grassland Farming in New England
BB-11-41 Why Soybeans Should Be Fertilized
EE-11-41 Cane Fruit Responds to High Potash
HH-12-41 Some Newer Ideas on Orchard Fertility
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B-1-42 Growing Ladino Clover in the Northeast
E-2-42 Fertilizing for More and Better Vegetables
F-2-42 Prune Trees Need Plenty of Potash
G-3-42 More Legumes for Ontario Mean More Cheese for Britain
H-3-42 Legumes Are Essential to Sound Agriculture
I-3-42 High-grade Fertilizers Are More Profitable
P-5-42 Purpose and Function of Soil Tests
Q-5-42 Potash Extends the Life of Clover Stands
S-6-42 A Comparison of Boron Deficiency Symptoms and Potash Leafhopper Injury on Alfalfa
T-6-42 The Fertilization of Pastures and Legumes
Y-8-42 The Southeast Can Grow Clover and Alfalfa
Z-8-42 The One-Mule Farmer Needs a New Machine
AA-10-42 Growing Legumes for Nitrogen
DD-10-42 Clover Pastures for the Coastal Plains
EE-11-42 Lespedeza Pastures for Florida
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D-1-43 For Hershey Orchards—Complete Fertilizer
E-1-43 Borax for Alfalfa in Tennessee
F-1-43 Boron Improves Canning Beets
G-1-43 Plow-Sole Fertilizers Make Good Showing
H-2-43 Plant Food for Peach Profits
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N-3-43 Boron and Potash for Alfalfa in the Northeast
O-3-43 Indirect Nitrogen Fertilization
P-3-43 Ohio Farmers Try Plow-Under Fertilizers
Q-3-43 Winning the Battle for the Land
S-4-43 Plow-Sole Fertilizers Benefit Tomatoes
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V-4-43 Permanent Pastures Need Help
W-4-43 The Soil Is the Basis of Farming Business
X-5-43 Malnutrition Symptoms & Plant Tissue Tests of Vegetable Crops
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HH-8-43 More Soybeans, Please!
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MM-11-43 Mississippi Farmers Improve Their Soil
NN-11-43 Maintaining Available Potassium in Soils
OO-11-43 Kudzu Conserves Southern Soils
PP-12-43 Commercial Fertilizers for Livestock Farms
QQ-12-43 Potash in War Production.

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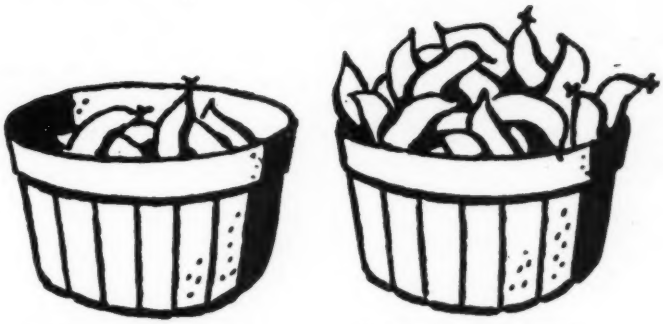

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- Potash Deficiency in Grapes and Prunes
- New Soils from Old
- Potash Production in America

We shall be pleased to loan any of these films to agricultural colleges and experiment stations, county agricultural agents, vocational teachers, responsible farm organizations, and members of the fertilizer trade.

Requests should be made *well in advance* and should include information as to group before which the film is to be shown, date of exhibition (alternative dates if possible) and period of time of loan.

For additional information write:

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